

IDAHO DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

**FEDERAL AID IN FISH RESTORATION
1994 Job Performance Report
Program F-71-R-19**



REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS CLEARWATER REGION (Subprojects I-B, II-B)

PROJECT I.	SURVEYS AND INVENTORIES
Job a.	Clearwater Region Mountain Lakes Investigations
Job b.	Clearwater Region Lowland Lakes Investigations
Job c.	Clearwater Region Rivers and Streams Investigations
PROJECT II.	TECHNICAL GUIDANCE

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1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project I: Surveys and Inventories

Subproject I-B: Clearwater Region

Job No.: a

Title: Mountain Lakes Investigations

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

Thirteen mountain lakes were surveyed in the N.F. Clearwater River drainage of the Clearwater National Forest during August and September 1994. Jack Lake and Mush Lake were found to be fishless, while Heather Lake and Ice Lake supported abundant populations of brook trout *Salvelinus fontinalis*. Of the 13, only 5 were recommended for continued stocking. Pete Ott Lake and Tillie Lake are recommended to be resurveyed in 1996.

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INTRODUCTION

The High Lakes Fisheries Project was initiated as a cooperative program of the U.S. Forest Service (USFS) and the Idaho Department of Fish and Game (IDFG) in 1986. The impetus of the program was to develop baseline ecological data on high mountain lakes. During the period 1986 through 1991, 190 lakes were surveyed on the Nez Perce National Forest and 55 surveyed on the Clearwater National Forest (Bahls 1990, 1992).

In 1994, the project was continued on the Clearwater National Forest as a partnership between the Clearwater National Forest, IDFG, and Lewis Clark State College in Lewiston, Idaho. Partial funding for the project was provided by the Clearwater National Forest and IDFG. Volunteer students from Lewis Clark State College conducted the field surveys and the zooplankton and invertebrate identification. This report presents the findings for 13 lakes surveyed in the Clearwater National Forest in 1994 (Figure 1). Five lakes were located each in the Elizabeth Mountain (Figure 2) and the Five Lakes Butte area (Figure 3). Three lakes were surveyed in the Pot Mountain areas (Figure 4).

OBJECTIVES

The objectives of the 1994 survey were to obtain, analyze, and summarize data to be used for:

1. Biological, physical and chemical inventory of each lake surveyed.
2. Long term monitoring.
3. Ecological effects of fish introductions.
4. Development of fish stocking rate guidelines for individual lakes.

METHODS

The standardized high mountain lake survey methodology as described by Bahls (1991) was used to survey 13 mountain lakes located in the North Fork Clearwater River drainage from August 1 to September 17, 1994.

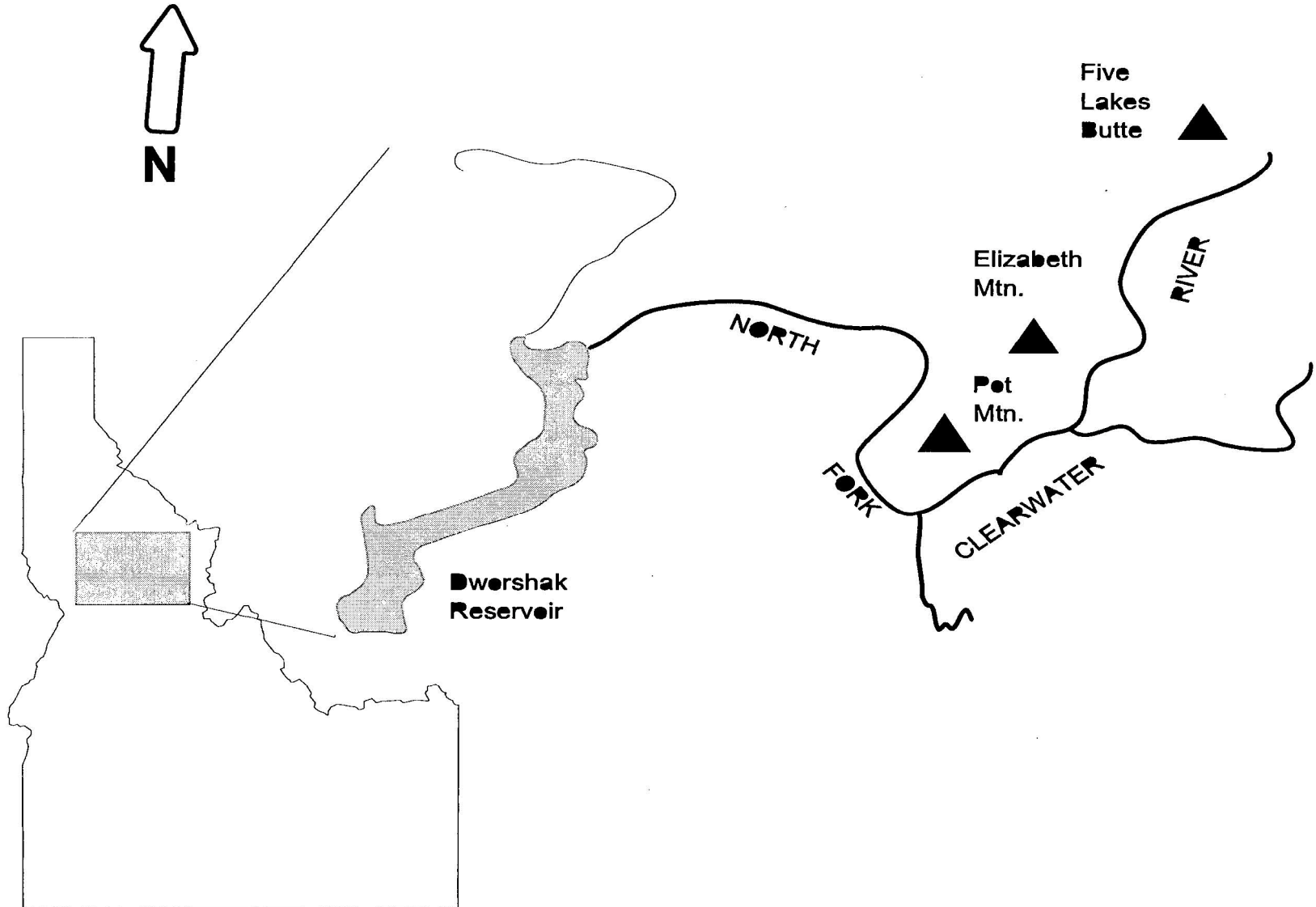


Figure 1. General location of mountain lakes surveyed in the Clearwater National Forest, 1994.

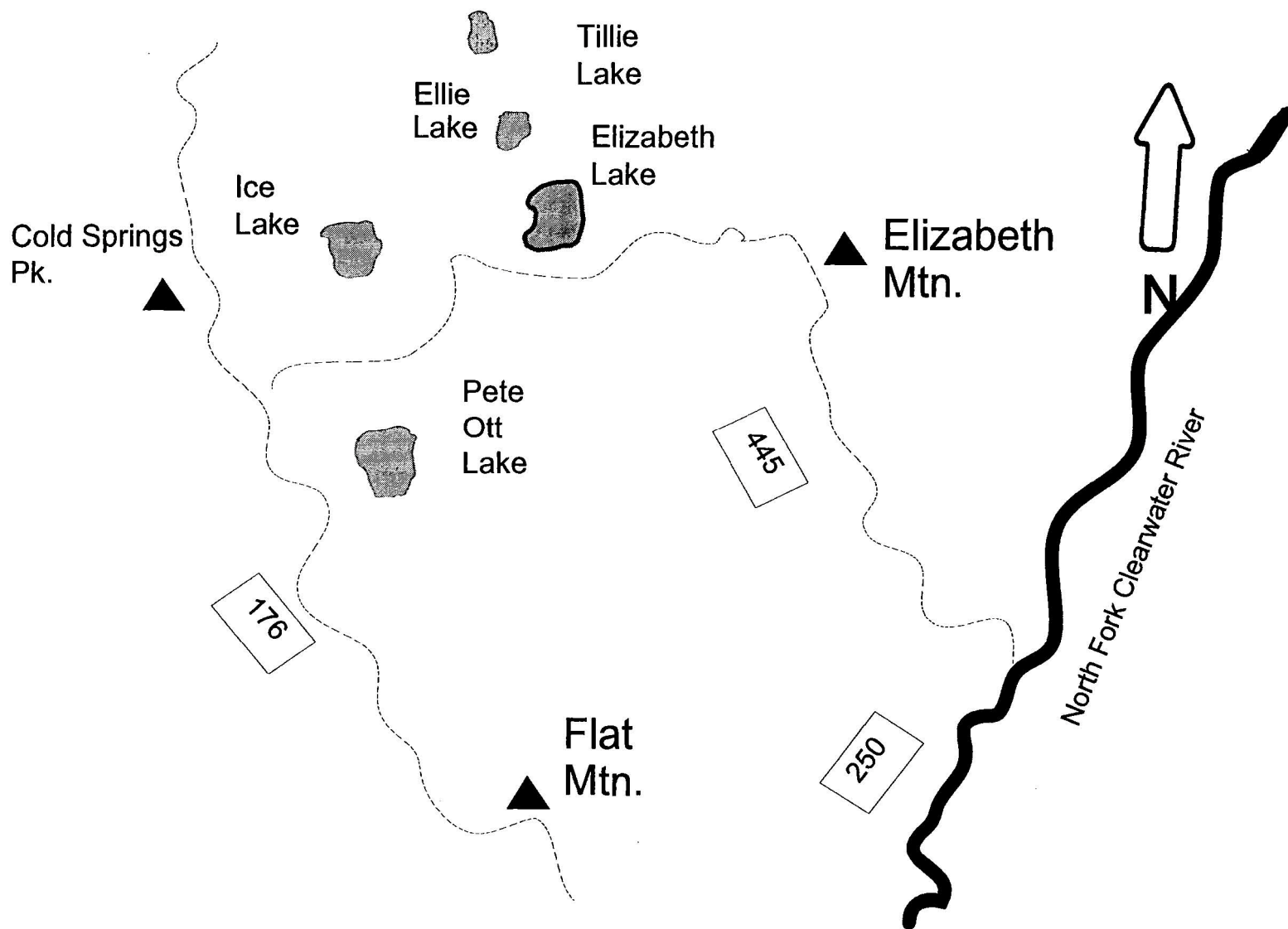
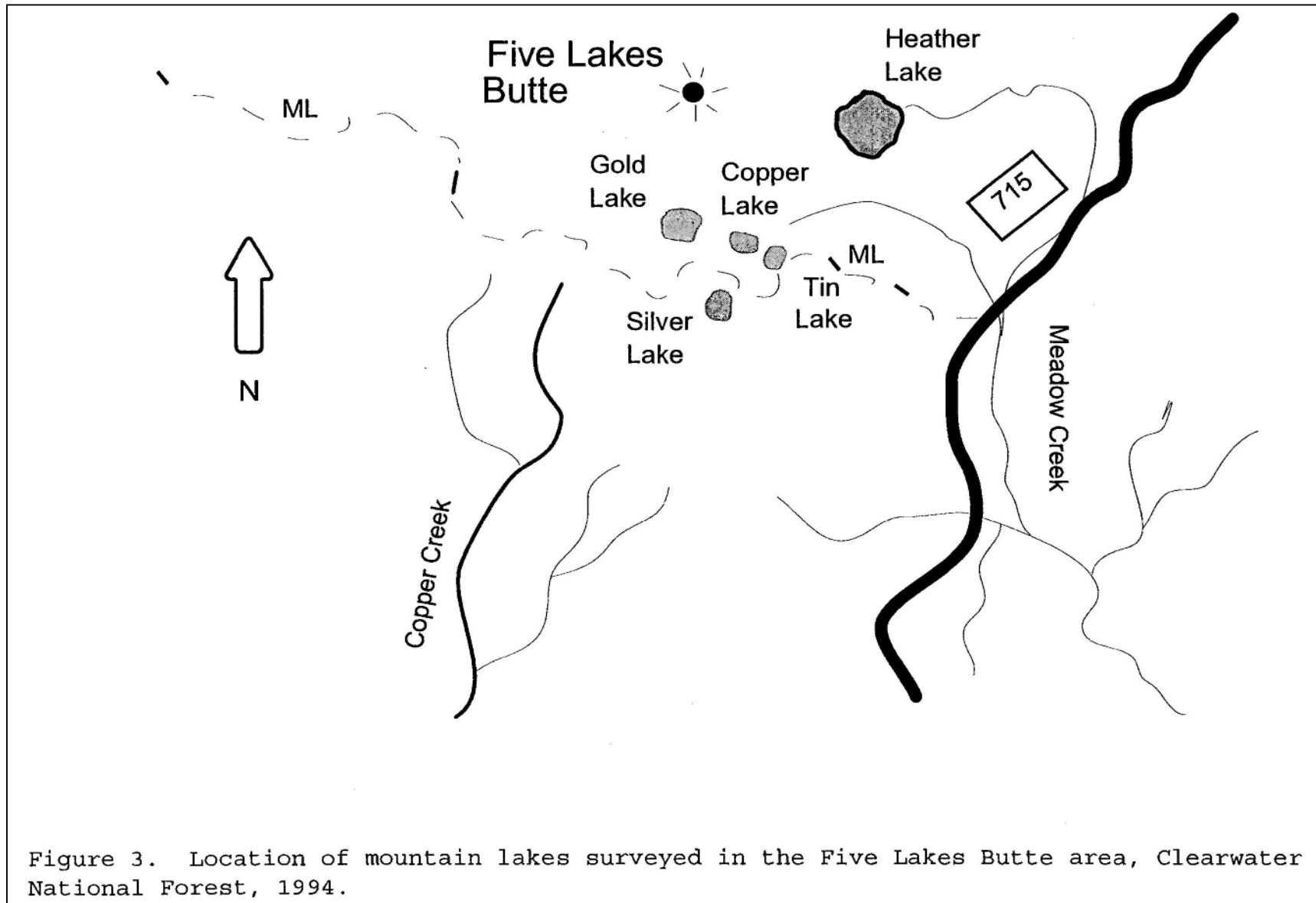


Figure 2. Location of mountain lakes surveyed in the Elizabeth Mountain area, Clearwater National Forest, 1994.



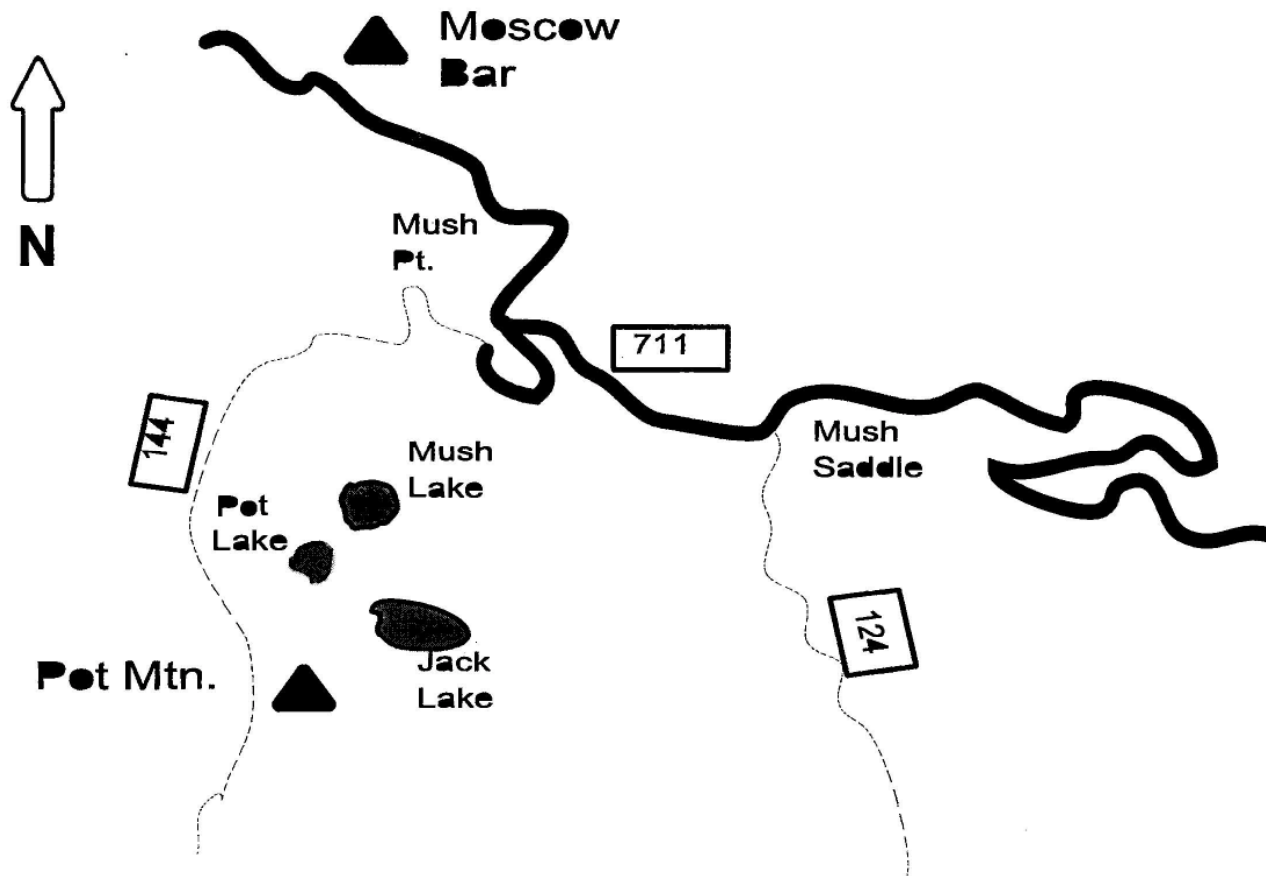


Figure 4. Location of mountain lakes surveyed in the Pot Mountain area, Clearwater National forest, 1994.

RESULTS AND DISCUSSION

The biological, physical, and chemical inventories of each lake are documented in the Appendix. Two lakes, Jack Lake and Mush Lake, were fishless, both of which are shallow with 85% to 100% of the lakes' areas less than 3 m in depth. Cutthroat trout *Oncorhynchus clarki*, rainbow trout *O. mykiss*, and brook trout *Salvelinus fontinalis* were the fish species observed. Abundant brook trout populations were found in two lakes, Heather Lake and Ice Lake.

A total of 104 fish specimens were collected in overnight gill net sets. Scales of each of these fish were analyzed for age determination (Tables 1, 2, 3).

The location description and proposed management direction based on information collected for each lake are presented in Table 4. Individual lake narrative as to management prescriptions are as follows.

Copper Lake

Copper Lake is borderline for sustaining fish populations because of the shallow depth and percentage of the lake that is less than 3 m in depth. Cutthroat trout (N=6) from the 1991 stocking were the predominant fish collected. The recommendation is to terminate stocking of this lake. Because of the present low human impact found on the lake shoreline, significant user displacement to other nearby lakes is not anticipated.

Elizabeth Lake

Some natural cutthroat and rainbow trout reproduction occurs in Elizabeth Lake, probably in the outlet stream. Although rainbow trout have not been stocked in the lake since 1976, three of these fish were found naturally in the lake. Stocking of 1,000 cutthroat trout fry is recommended on a three-year rotation beginning in 1997.

Ellie Lake

There appears to be no natural reproduction occurring in the lake system as all fish observed were of the 1991 stocking. Stocking of 1,000 cutthroat trout fry is recommended on a three-year rotation beginning in 1997.

Table 1. Age, length and weight data for cutthroat trout sampled in Clearwater National Forest mountain lakes, 1994.

Lake	Age	Length (cm)	Weight (g)
Copper	1	12	25
	2	18.5	70
	2	21	85
	2	22.5	100
	2	24	130
	2	25	150
Elizabeth	2	27	195
	2	28	170
	2	29	260
	3	28	240
	3	30	250
	3	32	310
	3	33	320
	3	34	300
Ellie	2	18	80
	2	19	70
	2	19	80
	2	24	120
	2	24	130
	2	24	160
	2	25	140
	2	25	150
Gold	2	17	55
	2	17.5	60
	2	18	60
	2	18	65
	2	18.5	60
	2	19	75
	2	19	75
	2	20	80
	2	21	80
	2	24	140
	2	25.5	185
	3	29.5	210

Table 1. Continued.

Lake	Age	Length (cm)	Weight (g)
Pete Ott	1	11.5	25
	1	12	25
	1	12.5	25
	1	16	50
	2	17	70
	2	17	70
	2	19	75
	2	20	80
	2	20	80
	2	22	115
	2	28.5	220
	3	34	395
	4	37	570
Silver	2	22	100
	2	22	120
	2	23	120
Tillie	1	10.5	20
	1	14	30
	1	14	40
	1	14.5	40
	1	15	40
	1	16	50
	2	24	140
	2	25	140
	2	25	160
	2	25	160
	2	25	180
	2	26	170
Tin	2	26	160

Table 2. Age, length and weight data for rainbow trout sampled in Clearwater National Forest mountain lakes, 1994.

Lake	Age	Length (cm)	Weight (g)
Elizabeth	1	11.5	25
	1	12	20
	1	15	40
Silver	1	11	20
	1	11	20
	1	11	20
	1	11	20
	1	13	30
	1	13	30
	1	16	50
	2	30	130
Tin	1	12.5	30
	1	15	50
	1	19	90

Table 3. Age, length and weight data for brook trout sampled in Clearwater National Forest mountain lakes, 1994.

Lake	Age	Length (cm)	Weight (g)
Heather	1	11	10
	1	11	20
	1	14	30
	1	14	40
	1	15	50
	1	15	50
	1	16	50
	1	18	60
	1	18	60
	1	18	70
	1	18	80
	2	23	170
	2	26	230
	2	31	400
Ice	1	10	20
	1	16	40
	1	16	50
	1	18	60
	1	19	40
	1	19	60
	1	19	60
	1	19	70
	2	19	70
	2	20	80
	2	21	90

Table 4. Location and proposed management direction for high mountain lakes surveyed in the Clearwater National Forest, 1994.

Lake Name	Legal Description			FSY	Class	PSY	Species	Int.
	Town	Range	Sect.					
Copper Lake	42N	9E	36	1967	Iib	No Stocking		
Elizabeth Lake	40N	9E	24	1966	IVb	1997	CT-2000	3
Ellie Lake	40N	9E	24	1967	IVb	1997	CT-500	3
Gold Lake	42N	9E	36	1967	IVb	1997	CT-500	3
Heather Lake	42N	9E	25	None	Iia	No stocking		
Ice Lake	40N	9E	26	1966	Iia	No Stocking		
Jack Lake	39N	8E	12	None	Ib	No Stocking		
Mush Lake	39N	8E	1	None	Ib	No Stocking		
Pete Ott Lake	40N	9E	26	1966	V	Discontinue Stocking Resurvey in 1996		
Pot Lake	39N	8E	12	1966	IVb	1997	CT-1000	3
Silver Lake	42N	9E	36	1967	IVb	1997	CT-1000	3
Tillie Lake	40N	9E	24	1966	V	Discontinue Stocking Resurvey in 1996		
Tin Lake	42N	9E	36	1967	IVa	No Stocking		

FSY-First year stocked; PSY-Proposed stocking year; Int.-Proposed stocking interval in years; Class Ib-Fishless lake with no past stocking record; Iib-Stocked lake with questionable survival; Iia-Natural trout reproduction at moderate level; IVb-Stockable lake; V-Further survey needed to determine status of natural reproduction.

Gold Lake

Limited spawning gravels were observed in the inlet stream, but the stream was dewatered at the time of survey. There is no indication that natural reproduction occurs. The only fish collected were cutthroat trout from the 1992 stocking. Stocking of 500 cutthroat trout fry is recommended on a three-year rotation beginning in 1997.

Heather Lake

The fish population in Heather Lake is exclusively brook trout, and these fish are naturally reproducing. Further stocking of this lake is not recommended.

Ice Lake

The fish population in Ice Lake is exclusively brook trout and these fish are naturally reproducing. Further stocking of this lake is not recommended.

Jack Lake

Jack Lake is a shallow, fishless lake and no future stocking is recommended.

Mush Lake

Mush Lake is a shallow, fishless lake and no future stocking is recommended.

Pete Ott Lake

Natural reproduction of trout is occurring in Pete Ott Lake as four age classes of cutthroat trout were observed. Stocking will be discontinued until a resurvey of the lake is completed in 1997.

Pot Lake

Fish populations in Pot Lake are low even though rainbow trout were stocked in 1991. Only one rainbow/cutthroat trout hybrid (42 cm) was captured in the overnight gill net. This fish must be from natural reproduction as no hybrids have been stocked in the lake. The management direction is to begin stocking of 1,000 cutthroat trout fry on a three-year rotation beginning in 1997 and to resurvey the lake in 1999.

Silver Lake

No natural trout reproduction is occurring in this lake system. Fish sampled are from recent stockings. Stocking of 1000 cutthroat trout fry is recommended on a three-year rotation beginning in 1997.

Tillie Lake

Some natural reproduction of cutthroat trout may be occurring in Tillie Lake. Stocking should be discontinued until a resurvey of the lake is completed in 1996.

Tin Lake

Trout survival in Tin Lake may be marginal because of the shallow depth of the lake, however natural spawning in the system was evidenced by small trout fry being observed. Further stocking of this lake is not recommended. Because present human impact to the lake and surrounding area is low, there is no anticipated significant user displacement to other nearby lakes.

ACKNOWLEDGMENTS

The partnership between the Clearwater National Forest, Idaho Department of Fish and Game, and Lewis Clark State College provided a positive arena to continue collecting valuable information on the high mountain lakes in the Clearwater River drainage. The project would not have happened without the assistance of Mr. Pat Murphy of the Clearwater National Forest, and Dr. Chris Wozencraft, Mr. Larry Phillips, and Mr. Bob Lantz of Lewis Clark State College. Our thanks for their support.

LITERATURE CITED

- Bahls, P. 1990. Report of the High Lake Fisheries Project, Nez Perce National Forest. Nez Perce National Forest publication, Idaho
- Bahls, P. 1991. A Survey Methodology for High Mountain Lakes. High Lakes Fisheries Project. Nez Perce National Forest and Idaho Department of Fish and Game, Boise.
- Bahls, P. 1992. Report of the High Lake Fisheries Project, Clearwater National Forest. Clearwater National Forest and Idaho Department of Fish and Game, Boise.

A P P E N D I X

COPPER LAKE

Lake Description: Copper Lake is located 100 meters to the north of Tin Lake. They are very similar in that moose frequent the lake, mixing the bottom compositions and causing the clarity to be poor; less than 50 cm. The lake itself is surrounded on all sides by approximately 50 meters of meadow.

Legal Description: Section 36 Township T. 42 N. Range R. 9 E.
Survey Date: 5 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 2.5
Max. depth (m) 3 Lake elevation (ft) 5465
Water temp surface (8am) 22 C Air temp (8am) 20 C
Water temp (deep) 22 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	solid rock outcrop	0
Boulders (Bo)	rocks > 50cm dia.	0
Rubble (Ru)	rocks < 50cm > 4cm dia.	0
Gravel (Gr)	4cm dia. > rocks > .5 cm	0
Sand (SA)	.5cm dia. > rocks > .06 cm	0
Silt (SI)	.06cm dia > particles >.004 cm dia.	
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area 100%

Major lake inlet(I), or outlet(0)

Stream characteristics	1	2	3	4	5
Inlet(I). outlet(0)	I	I	I		
Width (cm)	30	40	30		
Depth (cm)	5	8	10		
Flow velocity (1-3)	1	1	1		
Sand/gravel %	0	0	50		
Barrier type	NA	NA	DRY		
Potential alluvial spawn	0	0	NA		
# of fish observed	0	0	0		
number of seeps	<u>3</u>				

Stream data was collected to 50m from lake shore, or to barrier.

Natural reproduction is possible as there is a small amount of gravel located in the streams. There was no water in the outlet stream at the time of sampling.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Hemiptera, Family Gerridae (1 specimen)

=

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda, --

Class: Crustacea, Order: Cladocera

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae

Fish stomach content (obtained from 12 hour gill net set)

Order: Trichoptera, Family: Libellulidae

TERRESTRIAL VEGETATION

Forest percent coverage 5%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent 95% Dominant types Grass

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
---------	--------------	--------	----------

Moose	Visual	1	
-------	--------	---	--

Spotted frog	Visual	>20	
--------------	--------	-----	--

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Cutthroat (6)

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1967	CT/RB	364/340	146/136
1969	CT	1584	634
1972	CT	1050	420
1978	Ct	1000	400
1981	CT	1000	400
1983	CT	606	242
1987	CT	750	300
1989	CT	750	300
1990	CT	1093	437

12 hour gill net results:

Fish caught	Species	Length (mm)			Weight (g)		
		Min.	Max.	Mean	Min.	Max.	Mean
6	CT	12	25	20.5	25	150	93.4

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7																
6																
5		*														
4		*														
3		*														
2		*														
1	*	*														
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 2 Number of fish caught 0

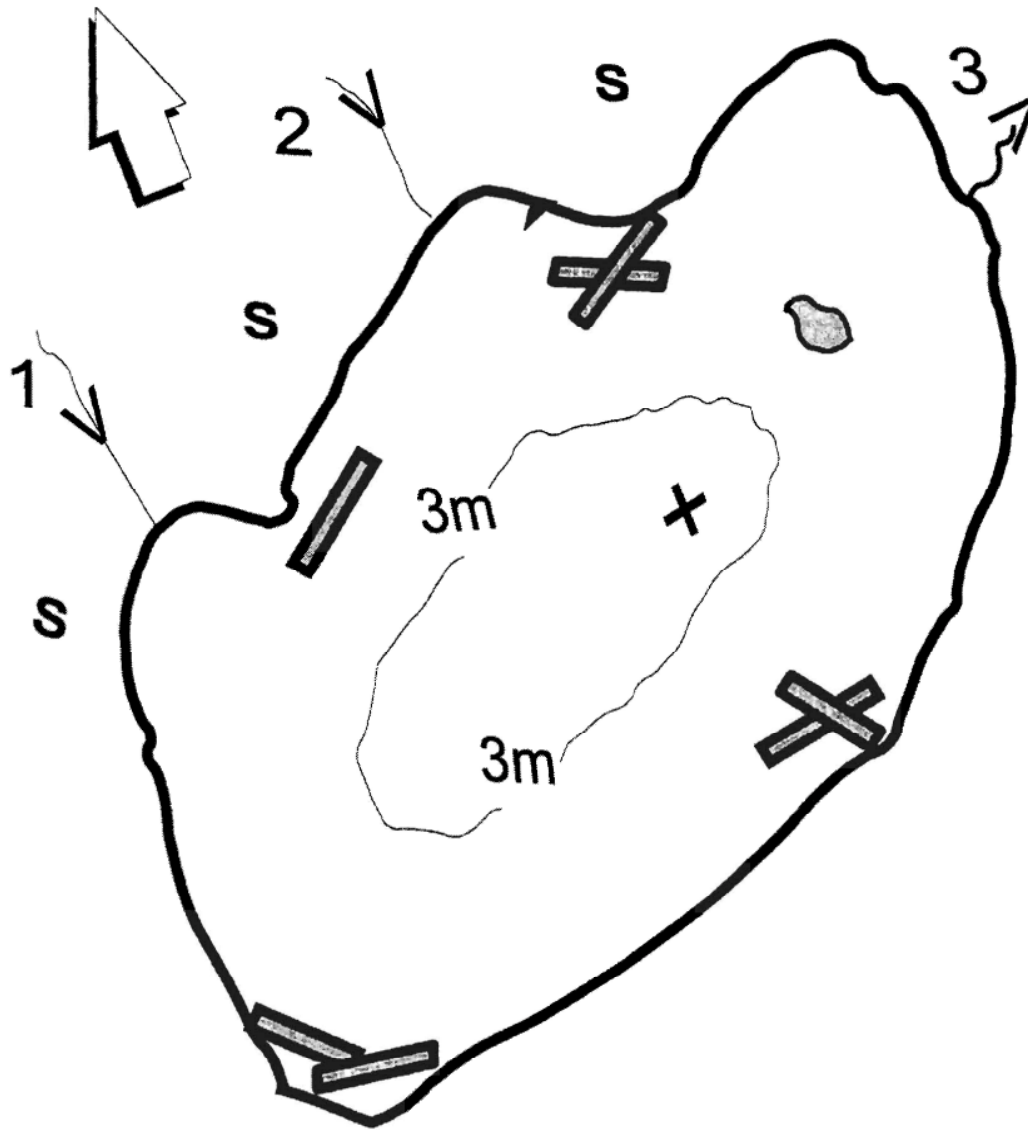
Anglers observed 0 Non-anglers observed 0

Campsite impact:

#	Size (m)	Degree of impact (high, mod, low)	Comments
A	_____	_____	_____
B	_____	_____	_____
C	_____	_____	_____
D	_____	_____	_____

Access difficulty:

Total distance from nearest road (miles) 1.5
Distance on a minor trail 1.5
Distance bushwack 0



• 3 meter contour interval

• Stream

• Seep

• Campsite

• Gill net location

• Rock

• Maximum depth +

• Flow direction

• Log

COPPER LAKE

ELIZABETH LAKE

Lake Description: Elizabeth Lake is located 3.5 miles north of the Five Lakes Butte trail head. The trail is well established to Gold Lake, but after Gold Lake there is no trail. The lake is shallow at the southern end with dead trees littering the lake bottom. The water is clear with visibility about 3 meters.

Legal Description: Section 24 Township T. 40 N. Range R. 9 E.
Survey Date: 17 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 5.5
Max. depth (m) 7 Lake elevation (ft) 5950
Water temp surface (8am) 21 C Air temp (8am) 19 C
Water temp (deep) 21 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	<u>solid rock outcrop</u>	<u>10</u>
Boulders (Bo)	<u>rocks > 50cm dia.</u>	<u>15</u>
Rubble (Ru)	<u>rocks < 50cm > 4cm dia.</u>	<u>5</u>
Gravel (Gr)	<u>4cm dia. > rocks > .5 cm</u>	<u>0</u>
Sand (SA)	<u>.5cm dia. > rocks > .06 cm</u>	<u>3</u>
Silt (SI)	<u>.06cm dia > particles >.004 cm dia.</u>	<u>67</u>
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area

7% Major lake inlet(I), or outlet(O)

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Stream characteristics					
Inlet(I). outlet(O)	<u>0</u>	<u>I</u>			
Width (cm)	<u>2</u>	<u>5</u>			
Depth (cm)	<u>10</u>	<u>5</u>			
Flow velocity (1-3)	<u>2</u>	<u>3</u>			
Sand/gravel %	<u>0</u>	<u>30%</u>			
Barrier type	<u>Dry</u>	<u>Steep</u>			
Potential alluvial spawn	<u>NA</u>	<u>No</u>			
# of fish observed	<u>2</u>	<u>0</u>			
number of seeps -					

Stream data was collected to 50m from lake shore, or to barrier.

Natural reproduction is occurring in lake. Stream No. 1 had fish (1-3 cm) near mouth. Stream No. 2 has a sandy composition.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae (nymph) - 3 specimens

Order: Trichoptera; Family: Limnephilidae - 4 specimens, 2
species

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda -- Class:

Crustacea, Order: Eucopepoda, Family: Centropagidae; Species:

Limnocalanus spp

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda -- Class:

Crustacea, Order: Eucopepoda, Family: Centropagidae; Species:

Limnocalanus spp

Fish stomach content (obtained from 12 hour gill net set)

Order: Odonata, Family: Libellulidae

Order: Trichoptera, Family: Libellulidae

TERRESTRIAL VEGETATION

Forest percent coverage 50%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent 50% Dominant types Talus slopes, bedrock
and grass.

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Bear	track	1	scat
Elk	track	?	
Pika	visual	5	

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Cutthroat, rainbow, and rainbow/cutthroat trout hybrids.

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1966	CT	2755	501
1969	CT	2640	480
1971	CT	3264	593
1976	RB	1500	273
1980	CT	600	109
1982	CT	1000	182
1985	CT	1000	182
1988	CT	1000	182
1991	CT	1000	182

12 hour gill net results:

Fish caught	Species	Length (mm)			Weight (g)		
		Min.	Max.	Mean	Min.	Max.	Mean
8	CT	15	35	31	170	340	268
2	RB	11.5	15	13.25	25	40	32.5
1	RB Hyb	12	12	12	20	20	20

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7																
6																
5			*													
4			*													
3		*	*		*											
2		*	*		*											
1		*	*		*											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 2 Number of fish caught 2

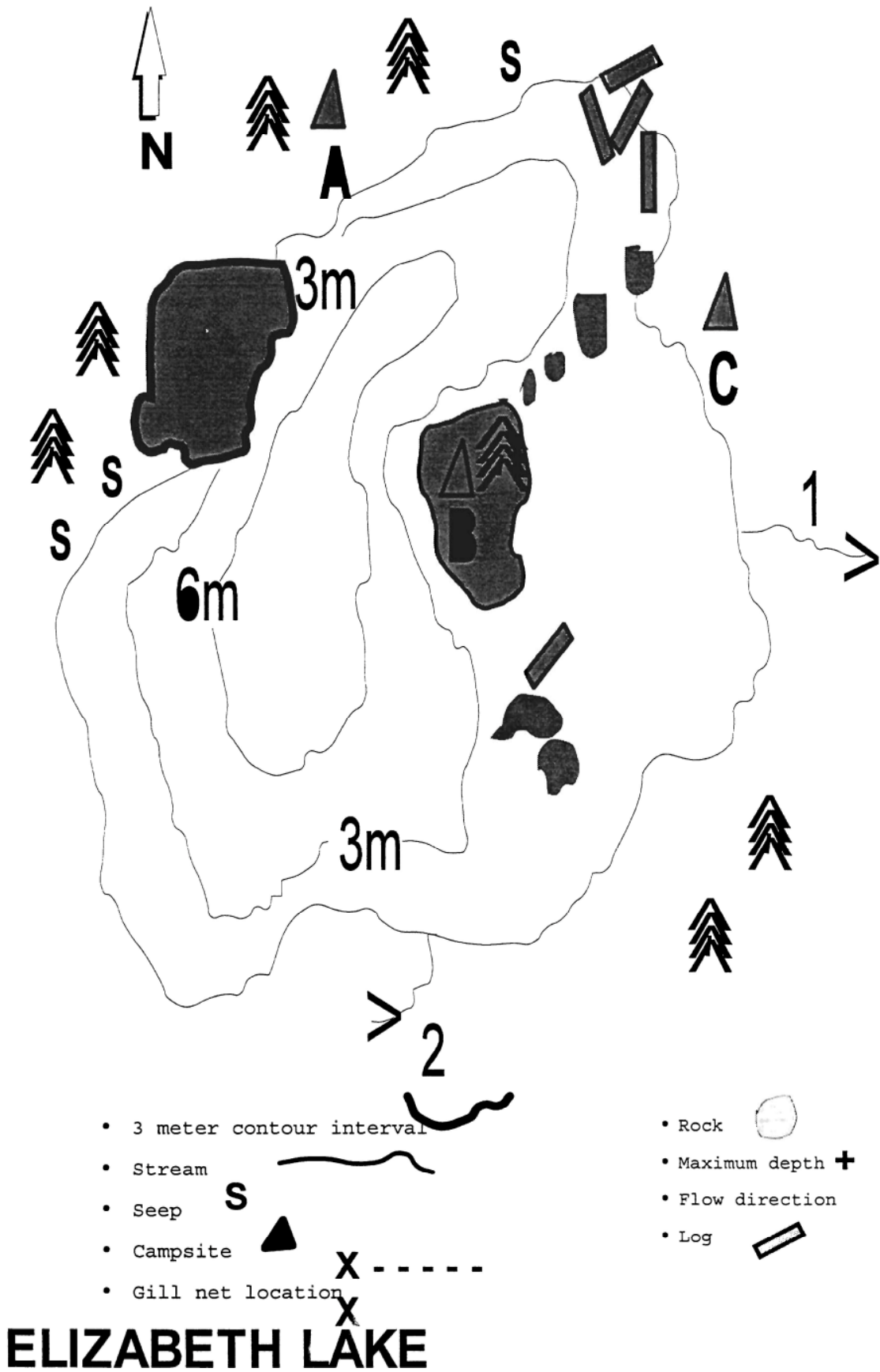
Anglers observed 0 Non-anglers observed 0

Campsite impact:

#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>NA</u>	<u>low</u>	<u>consists of one old fire</u> <u>ring</u>
B	<u>50x50</u>	<u>high</u>	<u>island site, trees & ground</u> <u>veg. removed</u>
C	<u>20x20</u>	<u>high</u>	<u>trees and ground veg.</u>
<u>absent</u>			
D			

Access difficulty:

Total distance from nearest road (miles) 3.5
Distance on a minor trail 3.5
Distance bushwack 0



ELLIE LAKE

Lake Description: Ellie Lake is surrounded to the east by thick stands of Sub Alpine Fir and to the west by steep rocky cliffs.. The lake is clear with visibility to about 4 meters. There is not good access to the lake, with bushwacking as the only option. The 3/4 mile hike from Tillie Lake was very difficult.

Legal Description: Section 24 Township T. 40 N. Range R. 9 E.

Survey Date: 19 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 1.25

Max. depth (m) 7 Lake elevation (ft) 6150

Water temp surface (8am) 19 C Air temp (8am) 20 C

Water temp (deep) 18 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	solid rock outcrop	50
Boulders (Bo)	rocks > 50cm dia	5
Rubble (Ru)	rocks < 50cm > 4cm dia.	5
Gravel (Gr)	4cm dia. > rocks > .5 cm	0
Sand (SA)	.5cm dia. > rocks > .06 cm	0
Silt (SI)	.06cm dia > particles >.004 cm dia.	40
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area
30%

Major lake inlet(I), or outlet(O)

Stream characteristics	1	2	3	4	5
Inlet(I). outlet(O)	0				
Width (cm)	30				
Depth (cm)	10				
Flow velocity (1-3)	2				
Sand/gravel %	silt				
Barrier type	steep				
Potential alluvial spawn	NA				
# of fish observed	0				
number of seeps -					

Stream data was collected to 50m from lake shore, or to barrier. Fish from the lake were approximately the same size.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

None found.

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Sub-Order: Calanoida

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species

Daphnia spp

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Sub-Order: Calanoida

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp

Fish stomach content (obtained from 12 hour gill net set)

Unidentifiable.

TERRESTRIAL VEGETATION

Forest percent coverage 30%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent 70% Dominant types Ferns, grass,
bedrock, and talus slopes.

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
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<u>Pika</u>	<u>visual</u>	<u>3</u>	
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FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Cutthroat Trout (8).

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1966	CT	668	534
1969	CT	1320	1056
1976	RB	1000	800
1980	CT	600	480
1982	CT	1000	800
1985	CT	1000	800
1988	CT	1000	800
1991	CT	1000	800

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)		
		Min.	Max.	Mean	Min.	Max.	Mean
8	CT	18	25	22.3	70	160	116.3

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8		*														
7		*														
6		*														
5		*														
4		*														
3		*														
2		*														
1		*														
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 4 Number of fish caught 24

Anglers observed 0 Non-anglers observed 0

Campsite impact:

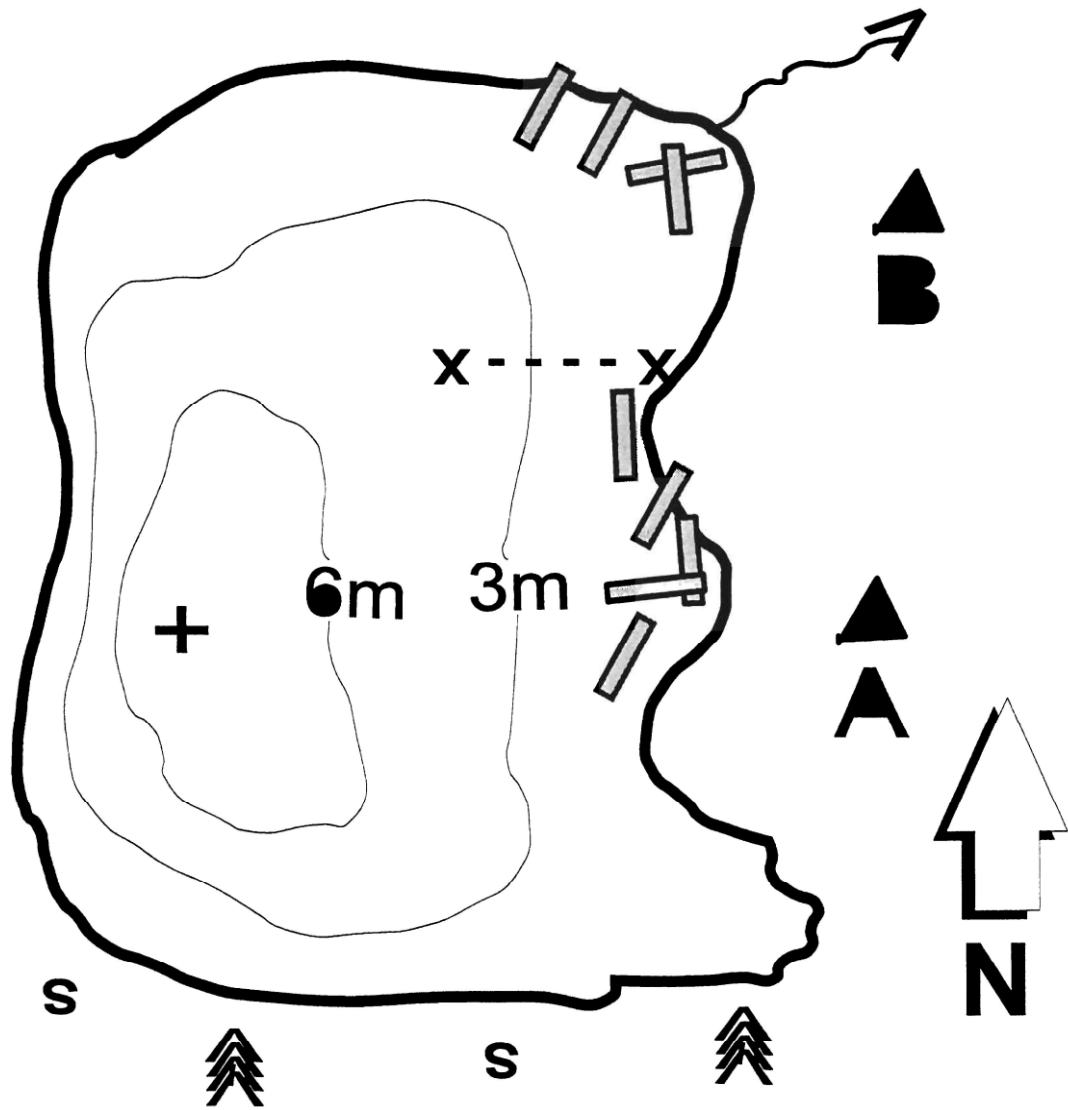
#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>10x20</u>	<u>mod</u>	<u>ground veg. partially absent</u> <u>and some trees cut</u>
B	<u>10x20</u>	<u>high</u>	<u>ground veg. Completely</u> <u>absent, garbage on ground,</u> <u>trees cut</u>
C			
D			

Access difficulty:

Total distance from nearest road (miles) 3.75

Distance on a minor trail 3.25

Distance bushwack .5



- 3 meter contour interval
- Stream
- Seep S
- Campsite
- Gill net location X - - - - X
- Rock
- Maximum depth +
- Flow direction
- Log

ELLIE LAKE

GOLD LAKE

Lake Description: Gold Lake is located just under Five Lakes Butte and is one mile from Silver Lake on a well maintained trail. The area around Gold Lake is steep with few trees. The lake is dark green in color and visibility is about 2 meters.

Legal Description: Section 36 Township T. 42 N. Range R. 9 E.
Survey Date: 3 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 2.5
Max. depth (m) 5 Lake elevation (ft) 6120
Water temp surface (8am) 23 C Air temp (8am) 23 C
Water temp (deep) 23 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	<u>solid rock outcrop</u>	<u>5</u>
Boulders (Bo)	<u>rocks > 50cm dia.</u>	<u>25</u>
Rubble (Ru)	<u>rocks < 50cm > 4cm dia.</u>	<u>5</u>
Gravel (Gr)	<u>4cm dia. > rocks > .5 cm</u>	<u>1</u>
Sand (SA)	<u>.5cm dia. > rocks > .06 cm</u>	<u>0</u>
Silt (SI)	<u>.06cm dia > particles >.004 cm dia.</u>	<u>69</u>
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area
50%Major lake inlet(I), or outlet(0)

Stream characteristics	1	2	3	4	5
Inlet(I). outlet(0)	<u>0</u>	<u>I</u>			
Width (cm)	<u>30</u>	<u>10</u>			
Depth (cm)	<u>20</u>	<u>10</u>			
Flow velocity (1-3)	<u>1</u>	<u>0</u>			
Sand/gravel %	<u>0</u>	<u>10</u>			
Barrier type	<u>NA</u>	<u>Dry</u>			
Potential alluvial spawn	<u>NA</u>	<u>0</u>			
# of fish observed	<u>0</u>	<u>0</u>			
number of seeps	<u>-2</u>				

Stream data was collected to 50m from lake shore, or to barrier.

Although we observed no spawning potential in the stream, and little in the lake, we did observe small trout in the lake itself. We believe there is natural reproduction but are not sure of the source.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae (adult) - 1 specimen

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda -- Class:

Crustacea, Order: Cladocera -- Class: Crustacea, Order:

Eucopepoda, Family: Centropagidae, Species: *Limnocalanus* spp

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda

Fish stomach content (obtained from 12 hour gill net set)

None found (insects).

TERRESTRIAL VEGETATION

Forest percent coverage 5%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent 95% Dominant types 50% grass, 50%

boulders and rubble

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
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Garter	visual	3	terrestrial
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CT trout	visual	4	<3 cm seen in lake
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Spotted Frog	visual	5	adult tadpoles
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FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Cutthroat trout

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1967	CT/RB	546/510	218/204
1969	RB	2160	864
1972	RB	600	240
1975	RB	1112	444.8
1978	RB	1500	600
1981	RB	880	352
1983	RB	789	312
1988	CT	2000	800
1991	RB	750	300
1992	CT	2000	800

12 hour gill net results:

Fish caught	Species	Length (mm)			Weight (g)		
		Min.	Max.	Mean	Min.	Max.	Mean
12	CT	17	29.5	20.5	55	210	95.4

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11		*														
10		*														
9		*														
8		*														
7		*														
6		*														
5		*														
4		*														
3		*														
2		*														
1		*														
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

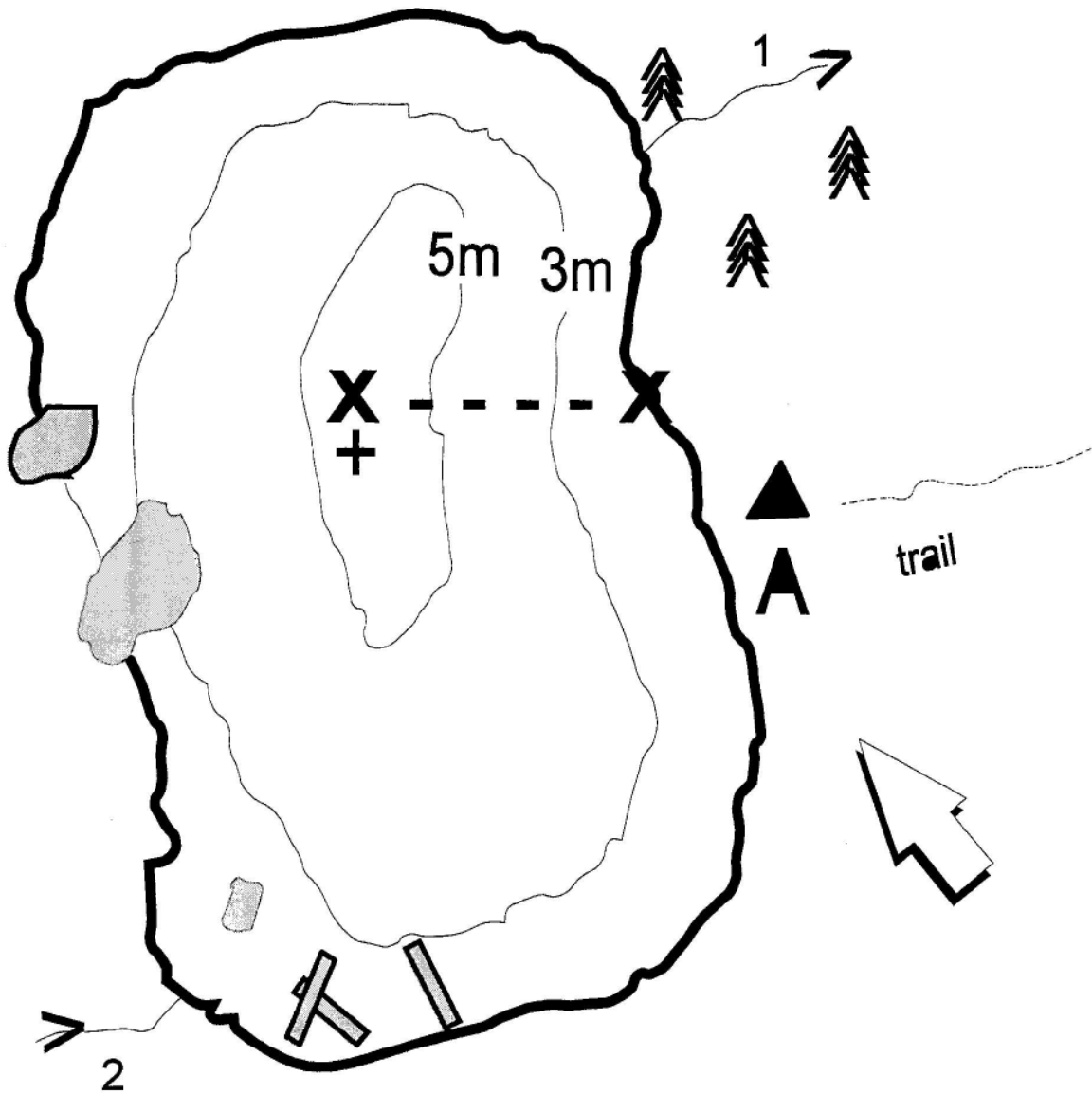
Number of hours fished 2 Number of fish caught 0
Anglers observed 0 Non-anglers observed 0

Campsite impact:

#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>50x50</u>	<u>high</u>	<u>veg gone, manure present,</u> <u>some trees removed</u>
B	<u> </u>	<u> </u>	
C	<u> </u>	<u> </u>	
D	<u> </u>	<u> </u>	

Access difficulty:

Total distance from nearest road (miles) 2.5
Distance on a minor trail 2.5
Distance bushwack 0



• 3 meter contour interval

• Stream

• Seep S

• Campsite

• Gill net location

• Rock

• Maximum depth +

• Flow direction

• Log

GOLD LAKE

HEATHER LAKE

Lake Description: Heather Lake is the largest of the lakes in the Five Lakes Butte area. The water color is dark green to brown, very deep (10 meters) and difficult to reach. There is no trail to Heather Lake. Heather Lake is surrounded by Sub Alpine Fir and steep talus slopes.

Legal Description: Section 245 Township T. 42 N. Range R. 9 E.
Survey Date: 4 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 5.25
Max. depth (m) 9 Lake elevation (ft) 6160
Water temp surface (8am) 21 C Air temp (8am) 22 C
Water temp (deep) 20 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	solid rock outcrop	20
Boulders (Bo)	rocks > 50cm dia.	10
Rubble (Ru)	rocks < 50cm > 4cm dia.	5
Gravel (Gr)	4cm dia. > rocks > .5 cm	5
Sand (SA)	.5cm dia. > rocks > .06 cm	5
Silt (SI)	.06cm dia > particles >.004 cm dia.	55
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area 50%

Major lake inlet(I), or outlet(0)

Stream characteristics	1	2	3	4	5
Inlet(I), outlet(0)	0	I	I		
Width (cm)	20	40	50		
Depth (cm)	5	20	40		
Flow velocity (1-3)	1	1	1		
Sand/gravel %	5	10	15		
Barrier type	Dry	WF	NA		
Potential alluvial spawn	NA	NA	NA		
# of fish observed	0	0	0		
number of seeps	-1				

Stream data was collected to 50m from lake shore, or to barrier.

Idaho Fish and Game (Lewiston) has no record for the stocking of brook trout into Heather Lake. No fish were observed in the streams, although many juvenile fish were caught in the gill net. This lake is naturally reproducing.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae (nymphs - 2 specimens)

Order: Hemiptera, Family: Gerridae (2 specimens)

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Family: ?

Class: Crustacea, Order: Eucopepoda, Family: Centropagidae,

Species: *Limnocalanus* spp

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: ?

Fish stomach content (obtained from 12 hour gill net set)

Order: Odonata, Family: Libellulidae

TERRESTRIAL VEGETATION

Forest percent coverage 60%

Tree species and percent coverage for each Sub Alpine Fir - 100%

Open ground percent 40% Dominant types 50% rubble, 50% grass

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Spotted frog	visual	7	adult and tadpole
chipmunk	visual	1	
Pika	visual	1	

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)
brook trout

Stocking record for the lake: *

Date Stocked	Species	# Stocked	# Fish per Surface Area

* Idaho Fish and Game stocking records show no record of Heather Lake being stocked.

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)		
		Min.	Max.	Mean	Min.	Max.	Mean
13	Brook	10	31.0	16.2	10	400	96.9

9

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11									*							
10									*							
9									*							
8									*							
7									*							
6									*							
5									*							
4									*							
3									*	*						
2									*	*						
1									*	*						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 0 Number of fish caught 0

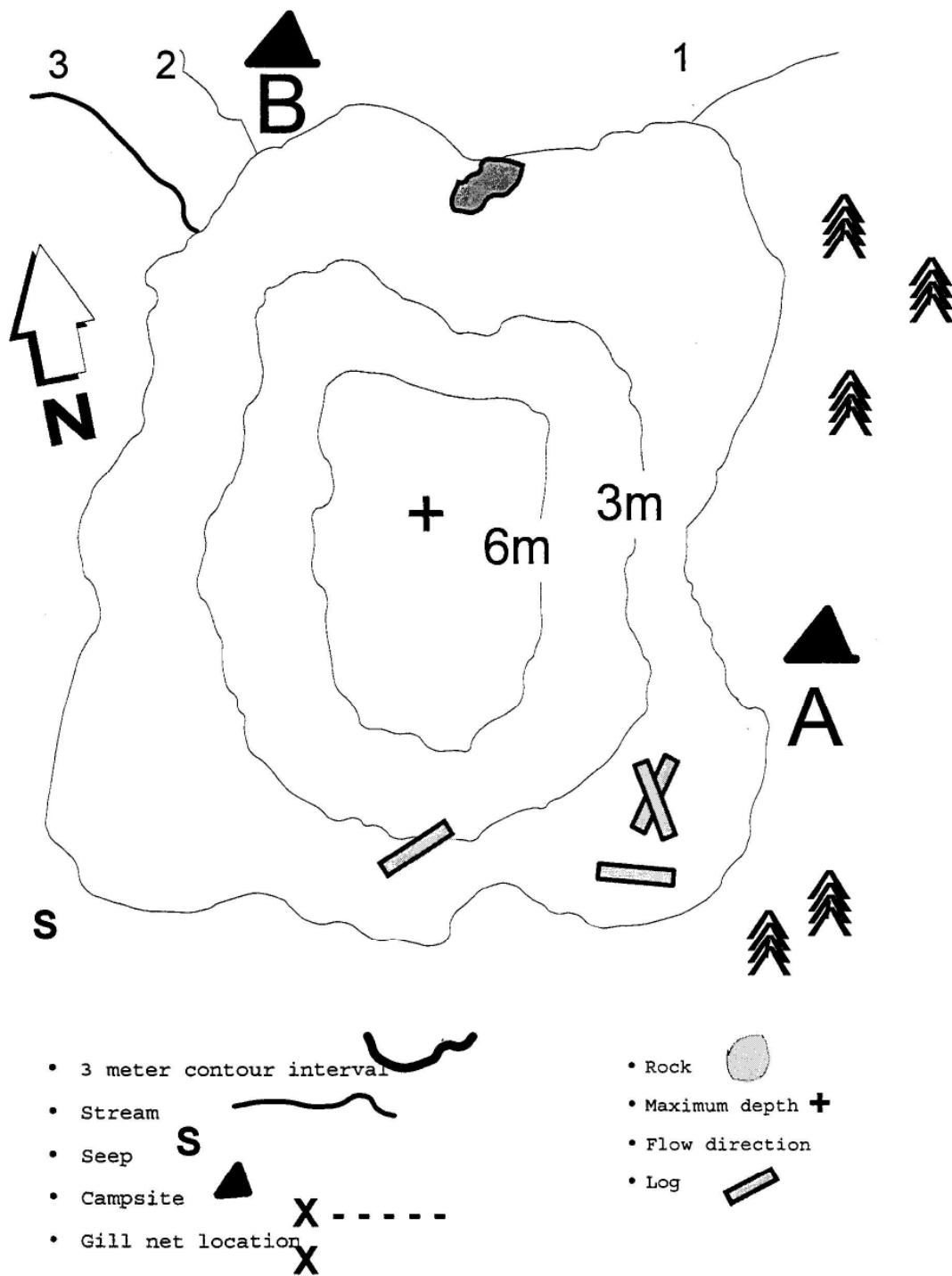
Anglers observed 0 Non-anglers observed 0

Campsite impact:

#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>10x10</u>	<u>high</u>	<u>litter, veg. absent, manure</u>
B	<u>20x30</u>	<u>high</u>	<u>2 rings, ground veg. absent</u>
C	<u> </u>	<u> </u>	<u>trees cut</u>
D	<u> </u>	<u> </u>	<u> </u>

Access difficulty:

Total distance from nearest road (miles) 3.5
Distance on a minor trail 2.5
Distance bushwack 1



HEATHER LAKE

ICE LAKE

Lake Description: Ice Lake is located approximately 1 mile from Pete Ott Lake. The trail is poor and steep. Ice Lake is very clear, the bottom is visible in most locations. To the east is a large meadow which is frequented by moose and elk (tracks).

Legal Description: Section 26 Township T. 40 N. Range R. 9 E.
Survey Date: 16 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 1
Max. depth (m) 7 Lake elevation (ft) 5850
Water temp surface (8am) 21 C Air temp (8am) 19 C
Water temp (deep) 21 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	solid rock outcrop	15
Boulders (Bo)	rocks > 50cm dia.	10
Rubble (Ru)	rocks < 50cm > 4cm dia.	0
Gravel (Gr)	4cm dia. > rocks > .5 cm	0
Sand (SA)	.5cm dia. > rocks > .06 cm	0
Silt (SI)	.06cm dia > particles >.004 cm dia.	75
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area 75%

Major lake inlet(I), or outlet(0)

Stream characteristics	1	2	3	4	5
Inlet(I). outlet(0)	0	I	I		
Width (cm)	100	100	100		
Depth (cm)	5	10	3		
Flow velocity (1-3)	1	1	1		
Sand/gravel %	5	20	30		
Barrier type	Dry	NA	NA		
Potential alluvial spawn	NA	Y	Y		
# of fish observed	5	>10	>10		
number of seeps -4					

Stream data was collected to 50m from lake shore, or to barrier.

Ice Lake has a large number of brook trout that are reproducing in the streams and possibly alluvial fans in the lake. Idaho Fish and Game has no record of brook trout being put into Ice Lake. The condition of the fish is that of overpopulation. All fish are skinny with large eyes and heads and are very abundant.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae (nymph), 1 specimen --

Order: Trichoptera, Family: Limnephilidae (case) 2 specimens --

Order: Hemiptera, Family: Gerridae, 1 specimen

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:
Daphnia spp

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Anostraca, Family: Branchinectidae,

Species: *Branchinecta* spp -- Class: Crustacea, Order:

Eucopepoda

Fish stomach content (obtained from 12 hour gill net set)

Order: Hemiptera, Family: Gerridae

Order: Odonata, Family: Libellulidae

TERRESTRIAL VEGETATION

Forest percent coverage 50%

Tree species and percent coverage for each Sub Alpine Fir - 100%

Open ground percent 50% Dominant types 75% bedrock, 25%
grass

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Mt. Goat	visual	1	100 m. on hillside
Marmot	visual	3	
Pika	visual	5	
Brook Trout	visual	>50	in streams and lake

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Brook Trout (18).

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1966	CT	688	688
1969	CT	1320	1320
1971	CT	3264	3264
1975	CT	766	760
1978	CT	1000	1000
1981	CT/RB	1000	1000
1985	CT	1000	1000
1988	CT	1000	1000
1991	CT	1000	1000

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)	
		Min.	Max.	Mean	Min.	Max.
Mean						
18	Brook	10	26	19.7	20	140
81.7						

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8									*							
7									*							
6									*							
5									*							
4									*							
3									*	*						
2									*	*						
1									*	*						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 2 Number of fish caught 10

Anglers observed 0 Non-anglers observed 0

Campsite impact:

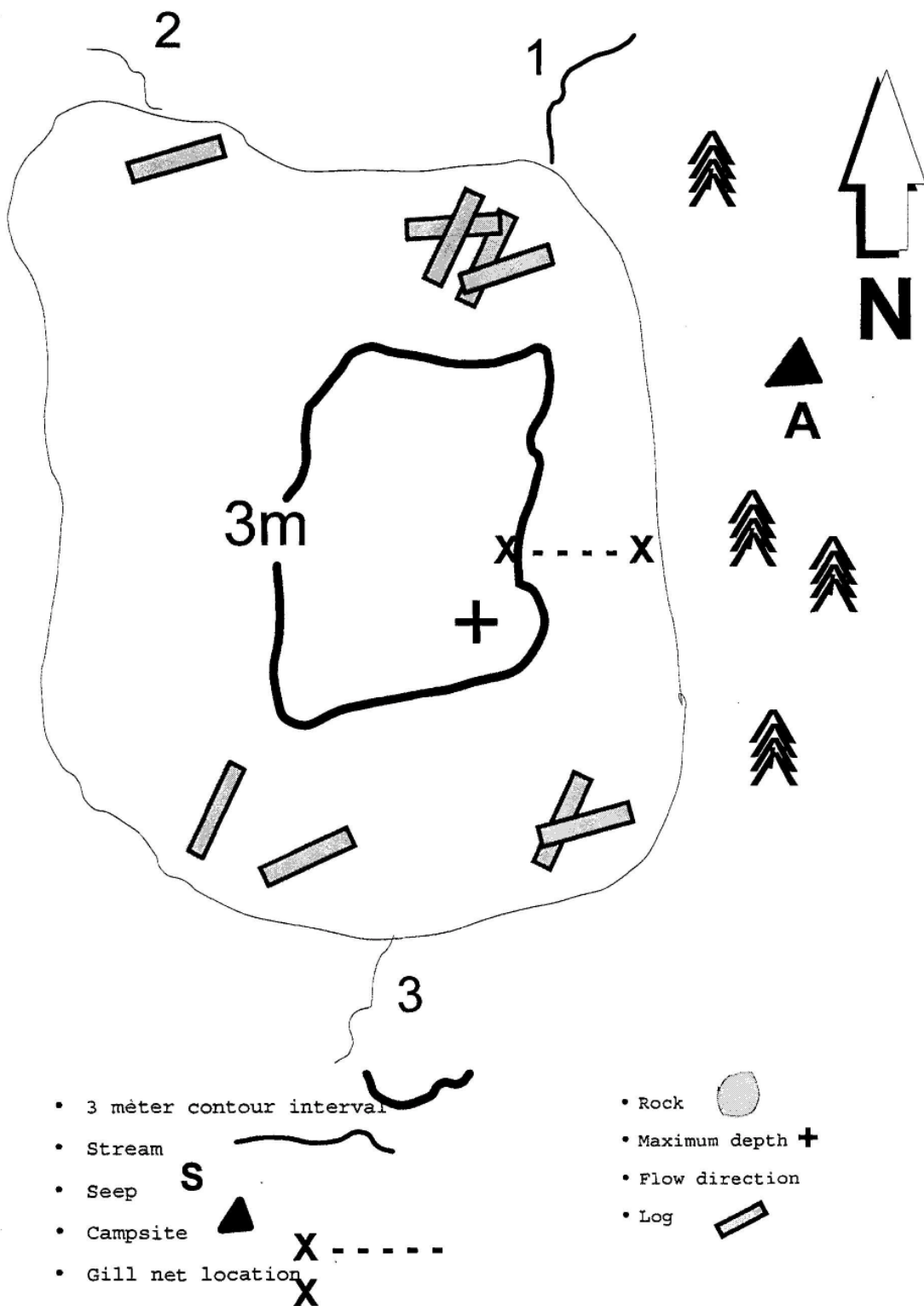
#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>10x10</u>	<u>low</u>	<u>not used in years</u>
B	<u> </u>	<u> </u>	<u> </u>
C	<u> </u>	<u> </u>	<u> </u>
D	<u> </u>	<u> </u>	<u> </u>

Access difficulty:

Total distance from nearest road (miles) 2.5

Distance on a minor trail 2.5

Distance bushwack 0



ICE LAKE

JACK LAKE

Lake Description: Jack Lake is surrounded by meadow on three sides and talus slope on the other. This shallow lake, less than 5 meters deep, is clear, with the bottom visible from any point on the shore. The bottom of the lake is covered by dead trees. There is no trail to Jack Lake.

Legal Description: Section 12 Township T. 39 N. Range R. 8 E.
 Survey Date: 17 Sept 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 2.5
 Max. depth (m) 5 Lake elevation (ft) 5830
 Water temp surface (8am) 13 C Air temp (8am) 16 C
 Water temp (deep) 13 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	solid rock outcrop	0
Boulders (Bo)	rocks > 50cm dia.	0
Rubble (Ru)	rocks < 50cm > 4cm dia.	0
Gravel (Gr)	4cm dia. > rocks > .5 cm	1
Sand (SA)	.5cm dia. > rocks > .06 cm	0
Silt (SI)	.06cm dia > particles >.004 cm dia.	99
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area 85%

Major lake inlet(I), or outlet(0)

Stream characteristics	1	2	3	4	5
Inlet(I), outlet(0)	0	I			
Width (cm)	100	100			
Depth (cm)	50	10			
Flow velocity (1-3)	1	1			
Sand/gravel %	silt	Silt			
Barrier type	steep	Steep			
Potential alluvial spawn	NA	No			
# of fish observed	0	0			
number of seeps <u>3</u>					

Stream data was collected to 50m from lake shore, or to barrier.

Rudy Armitage reported on July 12, 1978, that "Jack Lake is barren." After a 12 hour gill net in 1994, the lake is still considered barren.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

No terrestrial or aquatic insects found.

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Family: Centropagidae,

Species: *Limnocalanus* spp -- Class: Crustacea, Order:

Cladocera, Family: Daphnidae, Species: *Daphnia* spp -- Class:

Crustacea, Order: Eucopepoda, Sub-Order: Calanoida

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Family: Centropagidae,

Species: *Limnocalanus* spp -- Class: Crustacea, Order:

Cladocera, Family: Daphnidae, Species: *Daphnia* spp -- Class:

Crustacea, Order: Eucopepoda, Sub-Order: Calanoida

Fish stomach content (obtained from 12 hour gill net set)

Barren lake (NA).

TERRESTRIAL VEGETATION

Forest percent coverage 20%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent 80% Dominant types grass, talus & marsh

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Moose	track	?	tracks in & around lake
Garter	visual	1	caught in gill net & released
Spotted Frog	visual	10	
Kingfisher	visual	1	
Pika	visual	3	

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

None

Stocking record for the lake: *

Date Stocked	Species	# Stocked	# Fish per Surface Acre
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

* Idaho Fish and Game (Lewiston) reports no stocking history in Jack Lake

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)	
		Min.	Max.	Mean	Min.	Max.
Mean						
_____	_____	_____	_____	_____	_____	_____

_____	_____	_____	_____	_____	_____	_____

_____	_____	_____	_____	_____	_____	_____

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7																
6																
5																
4																
3																
2																
1																
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

	-- AGE OF FISH BY YEARS --
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Angling:

Number of hours fished 0 Number of fish caught 0

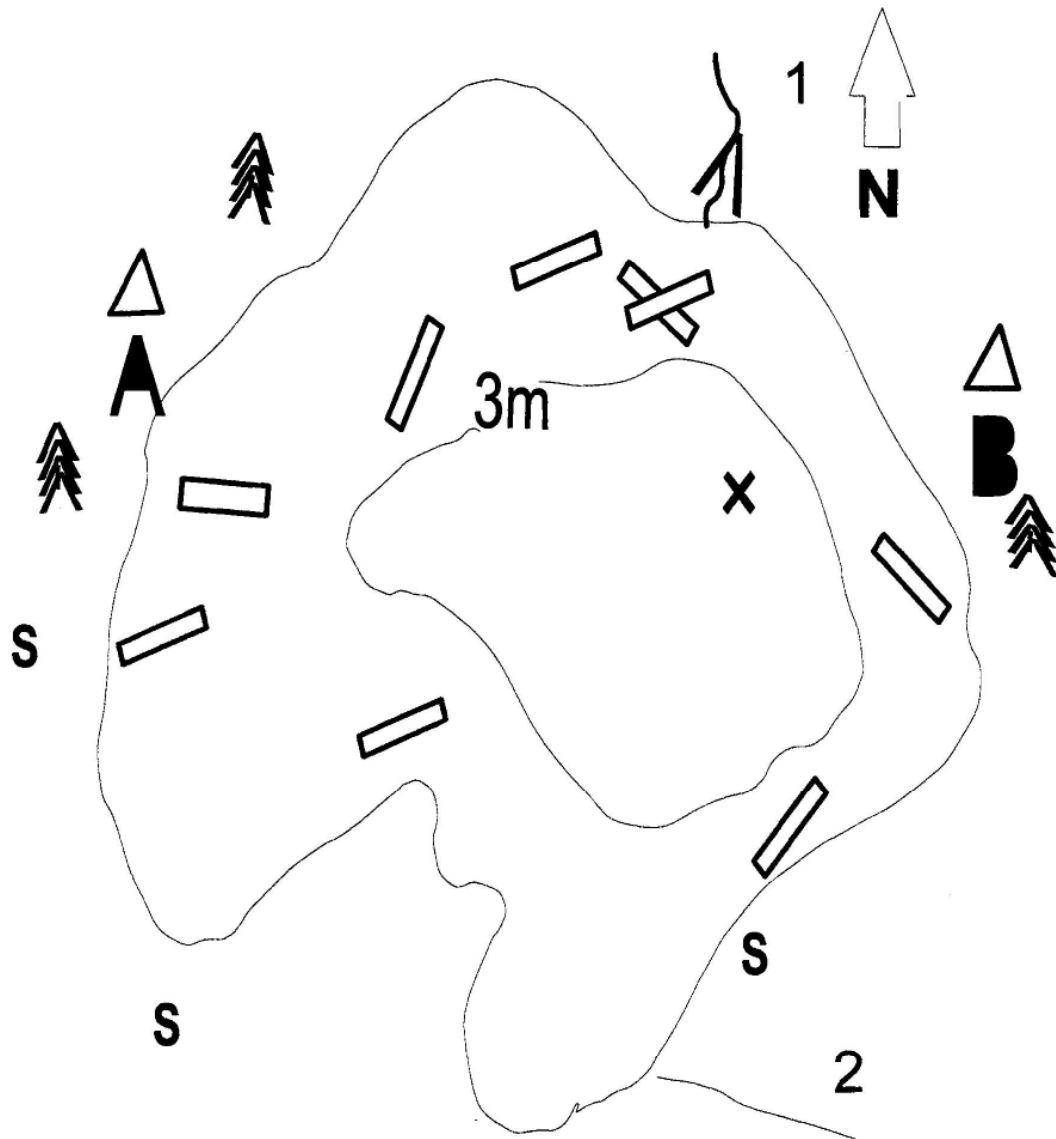
Anglers observed 0 Non-anglers observed 0

Campsite impact:

#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>10x10</u>	<u>low</u>	<u>old fire ring, not used in</u> <u>Years</u>
B	<u>5x5</u>	<u>low</u>	<u>only coals, no ring</u>
C	<u> </u>	<u> </u>	<u> </u>
D	<u> </u>	<u> </u>	<u> </u>

Access difficulty:

Total distance from nearest road (miles) 3.5
Distance on a minor trail 0
Distance bushwack 3.5



• 3 meter contour interval

• Stream

• Seep

• Campsite

• Gill net location

• Rock

• Maximum depth +

• Flow direction

• Log

JACK LAKE

MUSH LAKE

Lake Description: Mush Lake is located 2 miles north of Mush Saddle Campground. There is no trail to this or any other lake in the area. The hike is difficult and steep. The lake is shallow, less than 3 meters at any point. The entire lake shore is composed of mud (silt, organic) and large decaying trees.

Legal Description: Section 1 Township T. 39 N. Range R. 8 E.
Survey Date: 18 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 2.25
Max. depth (m) 3 Lake elevation (ft) 5550
Water temp surface (8am) 15 C Air temp (8am) 12 C
Water temp (deep) 15 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	<u>solid rock outcrop</u>	<u>0</u>
Boulders (Bo)	<u>rocks > 50cm dia.</u>	<u>0</u>
Rubble (Ru)	<u>rocks < 50cm > 4cm dia.</u>	<u>0</u>
Gravel (Gr)	<u>4cm dia. > rocks > .5 cm</u>	<u>1</u>
Sand (SA)	<u>.5cm dia. > rocks > .06 cm</u>	<u>1</u>
Silt (SI)	<u>.06cm dia > particles >.004 cm dia.</u>	<u>98</u>
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area 100%
Major lake inlet(I), or outlet(0)

Stream characteristics	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Inlet(I). outlet(0)	<u>0</u>				
Width (cm)	<u>100</u>				
Depth (cm)	<u>20</u>				
Flow velocity (1-3)	<u>1</u>				
Sand/gravel %	<u>0</u>				
Barrier type	<u>NA</u>				
Potential alluvial spawn	<u>NA</u>				
# of fish observed	<u>0</u>				
number of seeps <u>1</u>					

Stream data was collected to 50m from lake shore, or to barrier.

Mush Lake is shallow with very little sand or gravel located in the lake. The only stream has no spawning potential. In 1978 this lake was described by Phil Groves and Rudy Armitage as "barren" and still is.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Trichoptera Family: Limnephilidae

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Family: Centropagidae,

Species: *Limnocalanus* spp -- Class: Crustacea, Order:

Cladocera, Family: Daphnidae, Species: *Daphnia* spp -- Class:

Crustacea, Order: Eucopepoda

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Family: Centropagidae,

Species: *Limnocalanus* spp

Fish stomach content (obtained from 12 hour gill net set)

Lake barren.

TERRESTRIAL VEGETATION

Forest percent coverage 100%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent NA Dominant types NA

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Bear	track	2	small front paw track
Mt. Lion	track	1	5 1/2 inch diameter
Pika	visual	1	300 m from lake
Moose	track	1	
Kingfisher	visual	1	very upset with our presence
Spotted Frog	visual	1	

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)
Barren.

Stocking record for the lake: *

Date Stocked	Species	# Stocked	# Fish per Surface Acre
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

* Idaho Fish and Game has no record of stocking history.

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)	
		Min.	Max.	Mean	Min.	Max.
Mean						
_____ NA _____	_____	_____	_____	_____	_____	_____

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7																
6																
5																
4																
3																
2																
1																
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 0 Number of fish caught 0

Anglers observed 0 Non-anglers observed 0

Campsite impact: No campsites found (permanent).

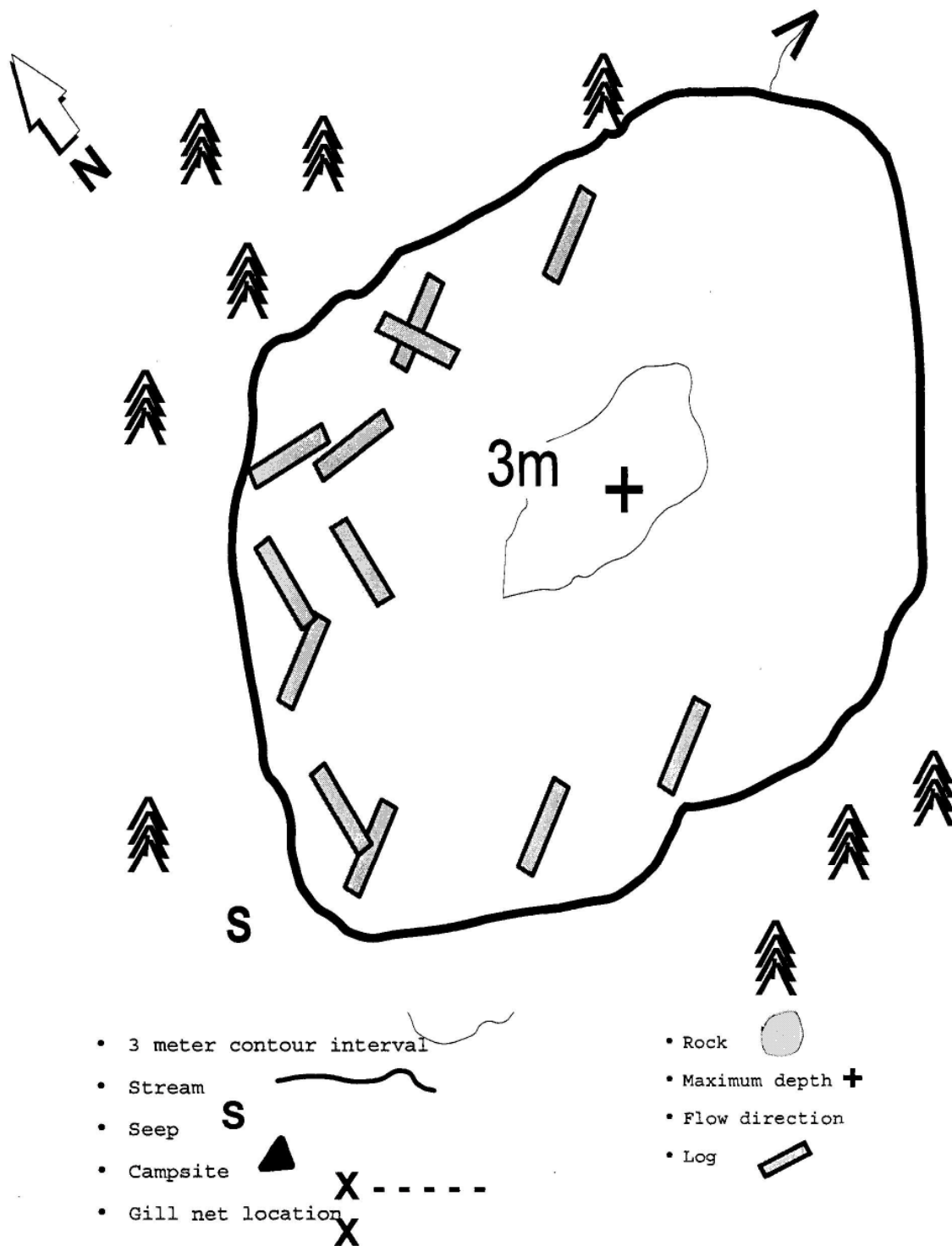
#	Size (m)	Degree of impact (high, mod, low)	Comments
A	_____	_____	_____
B	_____	_____	_____
C	_____	_____	_____
D	_____	_____	_____

Access difficulty:

Total distance from nearest road (miles) 2.0

Distance on a minor trail 0

Distance bushwack 2.0



MUSH LAKE

PETE OTT LAKE

Lake Description: Pete Ott Lake is dark green to brown in color and the visibility is around 3 meters. The trail to the lake is well established and maintained, although very steep. The area is frequented by off road vehicles, which are permitted throughout the lake area. The lake is surrounded on all sides by thick forest.

Legal Description: Section 26 Township T. 40 N. Range R. 9 E.
Survey Date: 15 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 4.5
Max. depth (m) 6 Lake elevation (ft) 5710
Water temp surface (8am) 21 C Air temp (8am) 18 C
Water temp (deep) 21 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	solid rock outcrop	5
Boulders (Bo)	rocks > 50cm dia.	5
Rubble (Ru)	rocks < 50cm > 4cm dia.	0
Gravel (Gr)	4cm dia. > rocks > .5 cm	0
Sand (SA)	.5cm dia. > rocks > .06 cm	0
Silt (SI)	.06cm dia > particles >.004 cm dia.	90
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area 50%
Major lake inlet(I), or outlet(0)

Stream characteristics	1	2	3	4	5
Inlet(I). outlet(0)	0				
Width (cm)	100				
Depth (cm)	10				
Flow velocity (1-3)	2				
Sand/gravel %	60				
Barrier type	log				
Potential alluvial spawn	NA				
# of fish observed	20				
number of seeps	5				

Stream data was collected to 50m from lake shore, or to barrier.

There is natural reproduction occurring in an outlet stream where over 50 fish (1 cm - 10 cm) were observed.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae (nymphs) - 5 specimens

Order: Hemiptera; Family: Gerridae - 1 specimen

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Polyphemidae,

Species: *Polyphemus* spp -- Class: Crustacea, Order:
Cladocera

Fish stomach content (obtained from 12 hour gill net set)

Order: Odonata, Family: Libellulidae

TERRESTRIAL VEGETATION

Forest percent coverage 70%

Tree species and percent coverage for each Sub Alpine Fir - 100%

Open ground percent 30% Dominant types 90% talus slopes,
10% grass

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Trout	visual	10	all in stream
Spotted frog	visual	7	
Sandpiper	visual	1	?

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Cutthroat trout (13 gill net), Cutthroat trout (1 angling)

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Arce
1966	CT	2171	482
1969	CT	2640	587
1971	CT	3264	725
1976	CT	1500	333
1980	RB	600	133
1982	CT	1000	222
1985	CT	2000	444
1988	CT	2000	444
1991	CT	1000	222

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)	
		Min.	Max.	Mean	Min.	Max.
Mean						
_____	_____	_____	_____	_____	_____	_____

_____	_____	_____	_____	_____	_____	_____

_____	_____	_____	_____	_____	_____	_____

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7		*														
6		*														
5		*														
4	*	*														
3	*	*														
2	*	*														
1	*	*	*	*												
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

	-- AGE OF FISH BY YEARS --
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Angling:

Number of hours fished 2 Number of fish caught 2

Anglers observed 0 Non-anglers observed 0

Campsite impact:

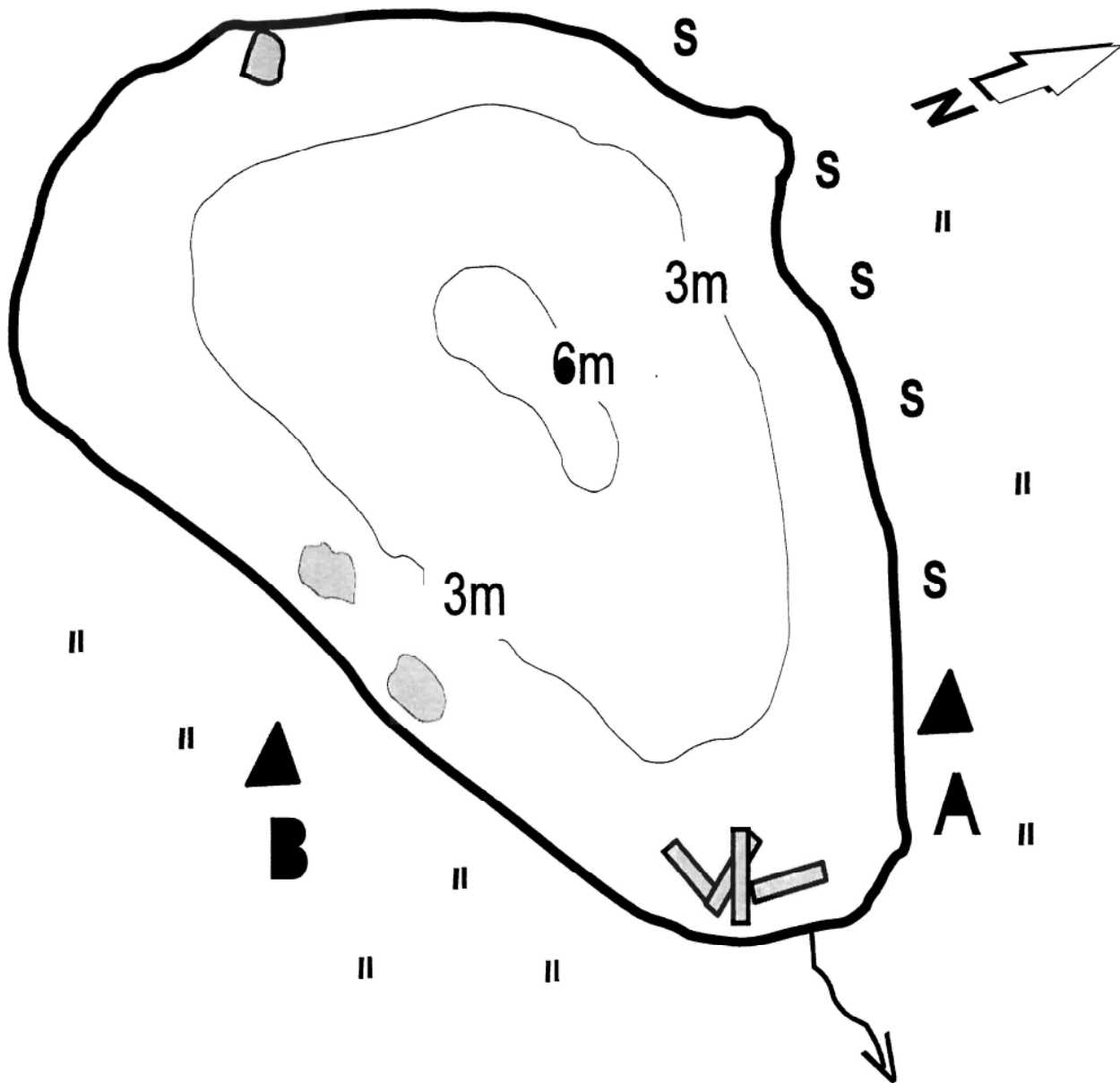
#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>30x30</u>	<u>high</u>	<u>used by ATV & horses,</u>
<u>ground</u>			<u>veg. Absent</u>
B	<u>20x10</u>	<u>high</u>	<u>toilet paper, human waste</u>
			<u>near lake, ground veg.</u>
			<u>absent</u>
C	<u> </u>	<u> </u>	<u> </u>
D	<u> </u>	<u> </u>	<u> </u>

Access difficulty:

Total distance from nearest road (miles) 1.5

Distance on a minor trail 1.5

Distance bushwack 0



• 3 meter contour interval

• Stream

• Seep

• Campsite

• Gill net location

• Rock

• Maximum depth +

• Flow direction

• Log

PETE OTT LAKE

POT LAKE

Lake Description: Pot Lake is located approximately 2.5 miles north of the campground at Mush Saddle. There is no trail to the lake. The lake is clear and deep, surrounded on three sides by steep cliffs.

Legal Description: Section 12 Township T. 39 N. Range R. 9 E.
Survey Date: 16 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 2.75
Max. depth (m) 10 Lake elevation (ft) 5980
Water temp surface (8am) 14 C Air temp (8am) 12 C
Water temp (deep) 14 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	<u>solid rock outcrop</u>	<u>5</u>
Boulders (Bo)	<u>rocks > 50cm dia.</u>	<u>5</u>
Rubble (Ru)	<u>rocks < 50cm > 4cm dia.</u>	<u>0</u>
Gravel (Gr)	<u>4cm dia. > rocks > .5 cm</u>	<u>0</u>
Sand (SA)	<u>.5cm dia. > rocks > .06 cm</u>	<u>0</u>
Silt (SI)	<u>.06cm dia > particles >.004 cm dia.</u>	<u>90</u>
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area
40%Major lake inlet(I), or outlet(0)

Stream characteristics	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Inlet(I). outlet(0)	<u>0</u>				
Width (cm)	<u>100</u>				
Depth (cm)	<u>120</u>				
Flow velocity (1-3)	<u>1</u>				
Sand/gravel %	<u>0</u>				
Barrier type	<u>WF</u>				
Potential alluvial spawn	<u>None</u>				
# of fish observed	<u>0</u>				
number of seeps	<u>2</u>				

Stream data was collected to 50m from lake shore, or to barrier.

Although Idaho Fish and Game has been actively stocking Pot Lake since 1966, the lake has been unable to support any populations.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae, Species ?

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: ?

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Family: ?

Class: Crustacea, Order: Cladocera, Family: ?

Fish stomach content (obtained from 12 hour gill net sit)

Unidentifiable insects?

TERRESTRIAL VEGETATION

Forest percent coverage 40%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent 70% Dominant types 90 % bedrock,
10% meadows

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
<u>Pika</u>	<u>visual</u>	<u>5</u>	<u></u>
<u>Elk</u>	<u>track</u>	<u>?</u>	<u></u>
<u>Deer</u>	<u>track</u>	<u>?</u>	<u></u>
<u>Kingfisher</u>	<u>visual</u>	<u>1</u>	<u>vocal</u>
<u>Lion</u>	<u>track</u>	<u>1</u>	<u>on hike to lake</u>

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

One fish hybrid: cutthroat and rainbow trout

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1966	CT	1800	655
1969	CT	2640	960
1971	CT/GL*	6528/6000	2374/2182
1974	CT	4000	1455
1977	CT	3000	1091
1978	RB	1500	545
1981	RB	888	323
1984	RB	1000	364
1987	RB	1000	364
1991	RB	500	

*Grayling

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (kg)		
		Min.	Max.	Mean	Min.	Max.	
Mean							
1	RB	42	42	42	1	1	1

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7																
6																
5																
4																
3																
2																
1																
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 0 Number of fish caught 0

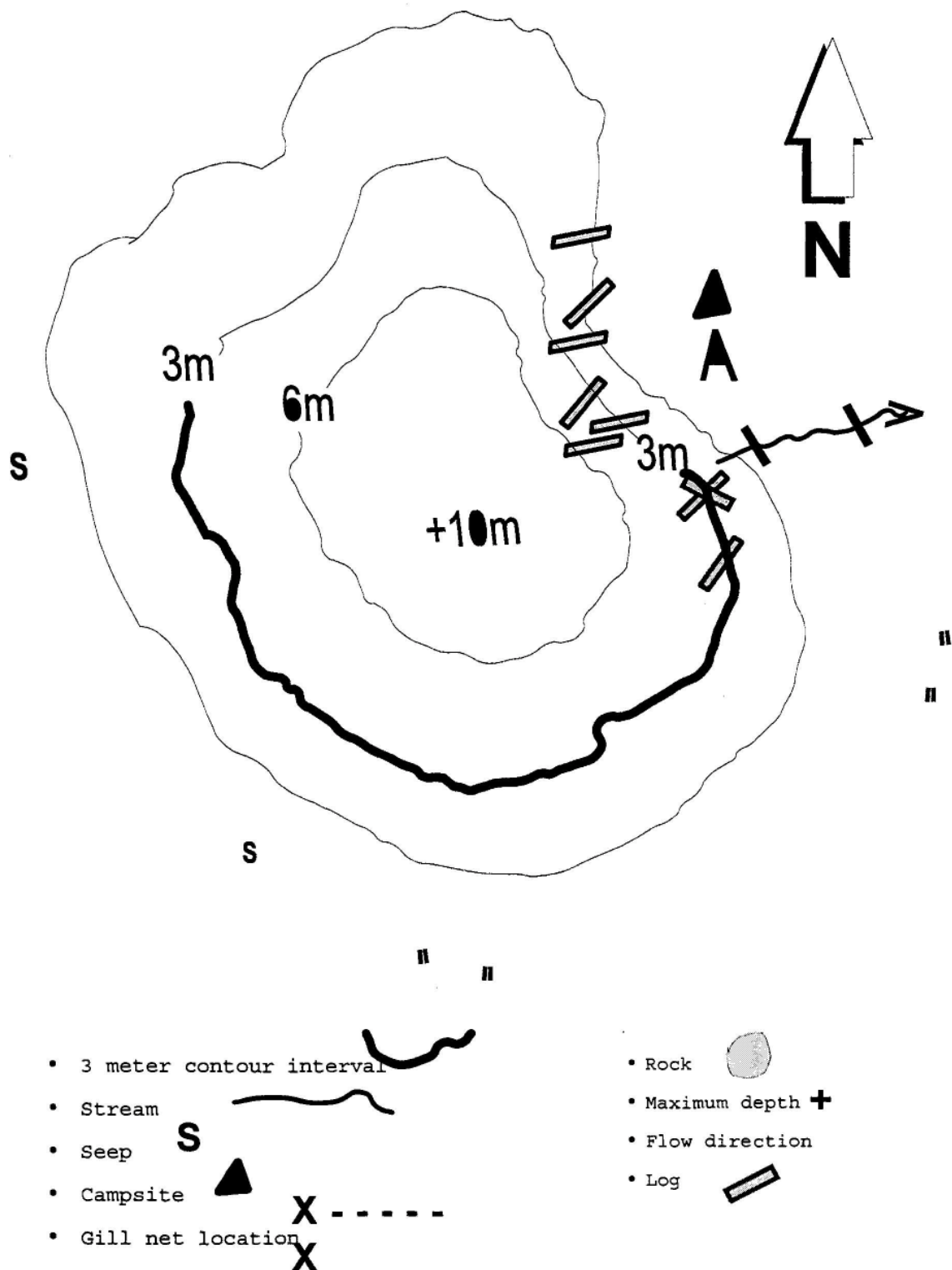
Anglers observed 0 Non-anglers observed 0

Campsite impact:

#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>10x5</u>	<u>low</u>	<u>one fire ring, low impact</u>
B	<u> </u>	<u> </u>	<u> </u>
C	<u> </u>	<u> </u>	<u> </u>
D	<u> </u>	<u> </u>	<u> </u>

Access difficulty:

Total distance from nearest road(miles) 2.5
Distance on a minor trail 0
Distance bushwack 2.5



POT LAKE

SILVER LAKE

Lake Description: Silver Lake is deep and clear. It is surrounded by steep talus slopes and by thick stands of Sub Alpine Fir. The lake is very clear with visibility to about 10 meters.

Legal Description: Section 36 Township T. 42 N. Range R. 9 E.
Survey Date: 2 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 4.25
Max. depth (m) 12 Lake elevation (ft) 5915
Water temp surface (8am) 22 C Air temp (8am) 23 C
Water temp (deep) 20 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	<u>solid rock outcrop</u>	<u>3</u>
Boulders (Bo)	<u>rocks > 50cm dia.</u>	<u>5</u>
Rubble (Ru)	<u>rocks < 50cm > 4cm dia.</u>	<u>5</u>
Gravel (Gr)	<u>4cm dia. > rocks > .5 cm</u>	<u>0</u>
Sand (SA)	<u>.5cm dia. > rocks > .06 cm</u>	<u>0</u>
Silt (SI)	<u>.06cm dia > particles >.004 cm dia.</u>	<u>82</u>
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area 25-35%

Major lake inlet(I), or outlet(O)

Stream characteristics	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Inlet(I). outlet(O)	<u>0</u>				
Width (cm)	<u>25</u>				
Depth (cm)	<u>10</u>				
Flow velocity (1-3)	<u>1</u>				
Sand/gravel %	<u>0</u>				
Barrier type	<u>Log</u>				
Potential alluvial spawn	<u>NA</u>				
# of fish observed	<u>0</u>				
number of seeps	<u>-2</u>				

Stream data was collected to 50m from lake shore, or to barrier.

The only major stream had very little flow with no fish present. The bottom is composed of 10 cm of silt. There is very little potential for natural reproduction.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae (nymph) - 4 specimens

Zooplankton sample (deep) using plankton net sampler

Order: Cladocera, Family: Daphnidae, Species: *Daphnia* spp

Zooplankton sample (shallow) using plankton net sampler

Unidentified Cladocera

Fish stomach content (obtained from 12 hour gill net set)

Order: Odonata, Family: Libellulidae

TERRESTRIAL VEGETATION

Forest percent coverage 50%

Tree species and percent coverage for each Sub Alpine Fir - 100%

Open ground percent 50% Dominant types 60% grass, 40% talus
Slopes

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Spotted frog	visual	10	
Elk	visual	1	cow
Pika	visual	>10	
Mule Deer	visual	1	

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Rainbow trout and cutthroat trout.

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1967	CT	910	167
1969	RB	2160	455
1972	RB	1200	253
1975	RB	1112	234
1978	RB	2000	421
1981	RB	888	187
1987	CT	2500	526
1989	CT	2500	526
1990	CT	2760	581
1991	CT	2500	526
1993	RB	2500	526

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)	
		Min.	Max.	Mean	Min.	Max.
Mean						
8	RB	11	30	14.8	20	150
42.5						
3	CT	22	23	22.3	100	120
113.4						

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7					*											
6					*											
5					*											
4					*											
3		*			*											
2		*			*											
1		*			*	*										
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 4 Number of fish caught 8

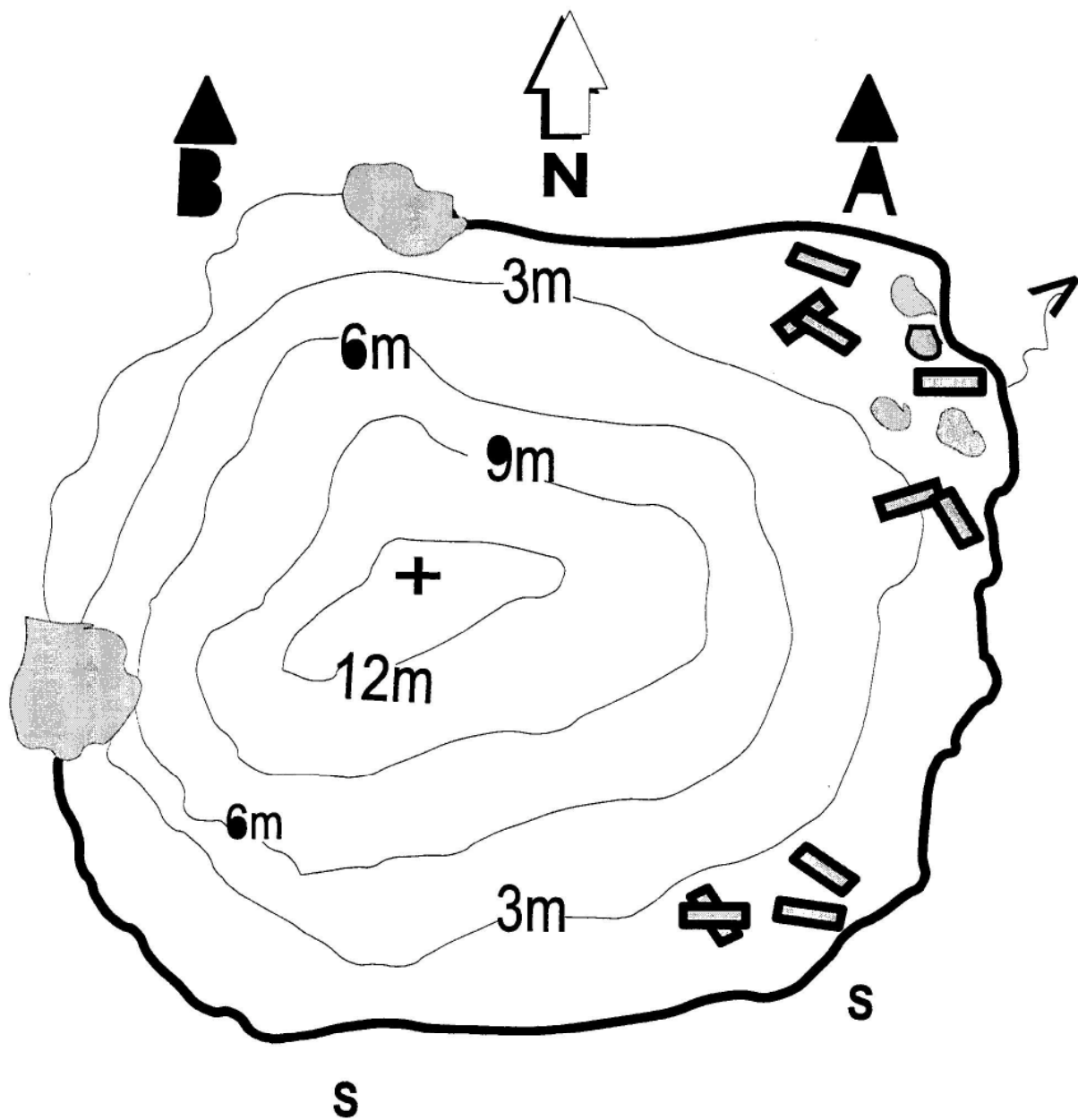
Anglers observed 0 Non-anglers observed 0

Campsite impact:

#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u>100x100</u>	<u>high</u>	<u>many fire rings, 50% veg.</u> <u>gone, some trees cut</u>
B	<u>10x10</u>	<u>low</u>	<u>1 ring, not used in years</u>
C	<u> </u>	<u> </u>	<u> </u>
D	<u> </u>	<u> </u>	<u> </u>

Access difficulty:

Total distance from nearest road (miles) 2.0
Distance on a minor trail 2.0
Distance bushwack 0



• 3 meter contour interval

• Stream

• Seep

• Campsite

• Gill net location

• Rock

• Maximum depth +

• Flow direction

• Log

SILVER LAKE

TILLIE LAKE

Lake Description: Tillie Lake is located ½ mile north of the main trail to Elizabeth Mountain from Pete Ott Lake. A compass is necessary to find the lake. The lake is a dark green, almost emerald color. The visibility is fair, possibly 3 meters. The lake is located in a pocket and surrounded by steep cliffs.

Legal Description: Section 24 Township T. 40 N. Range R. 9 E.
Survey Date: 18 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 2.5
Max. depth (m) 7 Lake elevation (ft) 5750
Water temp surface (8am) 21 C Air temp (8am) 20 C
Water temp (deep) 20 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	solid rock outcrop	0
Boulders (Bo)	rocks > 50cm dia.	5
Rubble (Ru)	rocks < 50cm > 4cm dia.	5
Gravel (Gr)	4cm dia. > rocks > .5 cm	0
Sand (SA)	.5cm dia. > rocks > .06 cm	0
Silt (SI)	.06cm dia > particles >.004 cm dia.	85
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area
Major lake inlet(I), or outlet(0)

Stream characteristics	1	2	3	4	5
Inlet(I). outlet(0)	1	0			
Width (cm)	75	60			
Depth (cm)	30	5			
Flow velocity (1-3)	1	1			
Sand/gravel %	10	10			
Barrier type	steep	None			
Potential alluvial spawn	?	NA			
# of fish observed	0	0			
number of seeps -3					

Stream data was collected to 50m from lake shore, or to barrier.

It is unknown if natural reproduction is occurring. The fish caught in the net were nearly all the same size.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Odonata, Family: Libellulidae (4 specimens), Species ?

Order: Trichoptera, Family: Limnephilidae (case only) Species ?

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda, Family: ?

Phylum: Rotifera

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:

Daphnia spp -- Class: Crustacea, Order: Eucopepoda, Family: ?

Fish stomach content (obtained from 12 hour gill net set)

Unidentifiable insects?

TERRESTRIAL VEGETATION

Forest percent coverage 40%

Tree species and percent coverage for each Sub Alpine Fir

Open ground percent 70% Dominant types 50% bedrock,
30% grass, 20% talus slopes

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
---------	--------------	--------	----------

Elk	track	>10	
-----	-------	-----	--

Deer	visual	>5	
------	--------	----	--

Pika	visual	>5	
------	--------	----	--

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)

Cutthroat trout

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1966	CT	1000	400
1969	CT	1320	528
1976	CT	1000	400
1980	RB/CT	1000	400
1982	CT	1000	400
1985	CT	1000	400
1988	CT	1000	400
1991	CT	1000	400

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)		
		Min.	Max.	Mean	Min.	Max.	Mean
13	CT	14	29	23.7	30	210	106.9

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7																
6	*	*														
5	*	*														
4	*	*														
3	*	*														
2	*	*														
1	*	*														
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 0 Number of fish caught 0

Anglers observed 0 Non-anglers observed 0

Campsite impact: No permanent sites at lake.

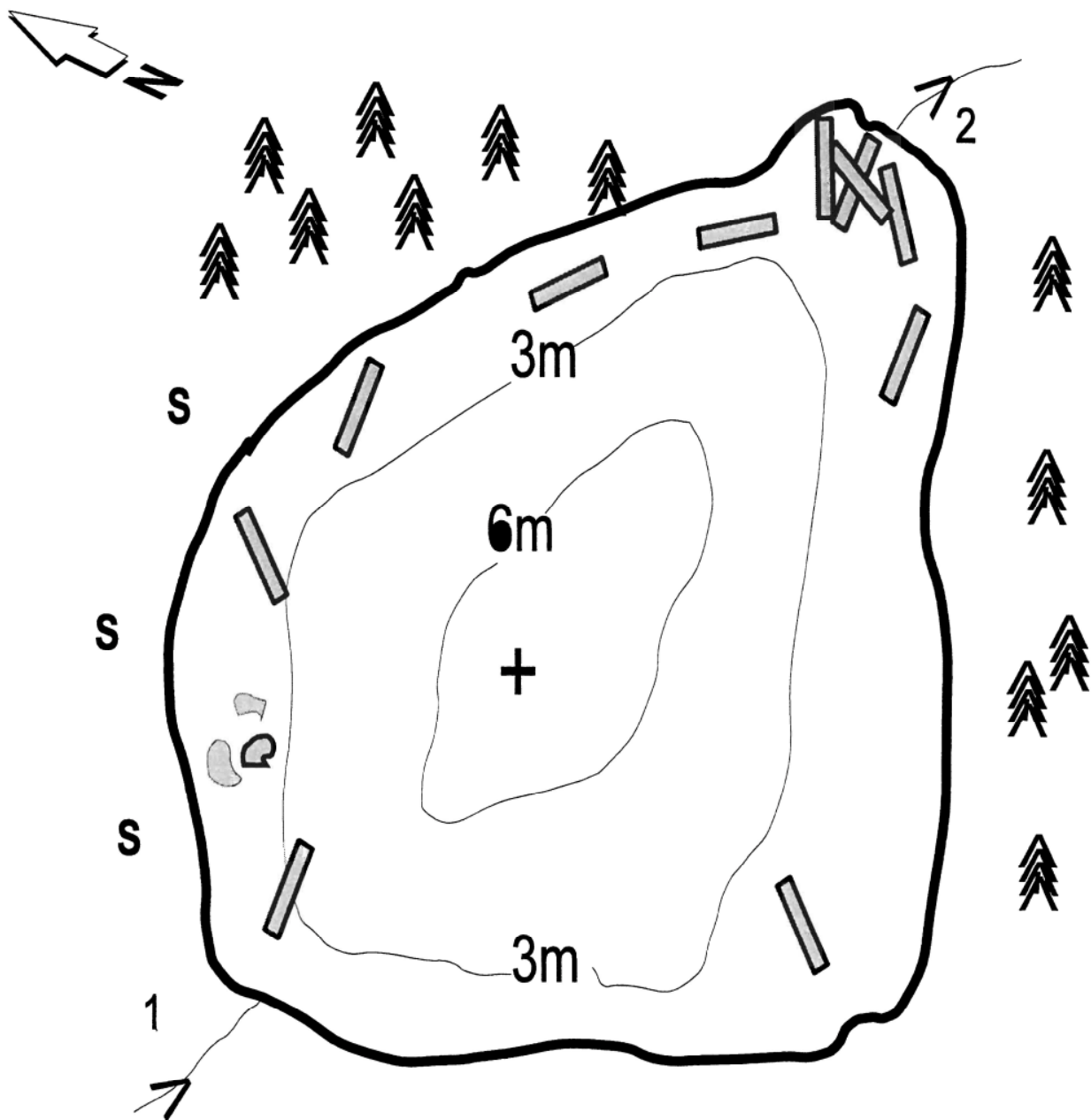
#	Size (m)	Degree of impact (high, mod, low)	Comments
A	<u> </u>	<u> </u>	<u> </u>
B	<u> </u>	<u> </u>	<u> </u>
C	<u> </u>	<u> </u>	<u> </u>
D	<u> </u>	<u> </u>	<u> </u>

Access difficulty:

Total distance from nearest road (miles) 4.5

Distance on a minor trail 3.75

Distance bushwack .75



- 3 meter contour interval
- Stream
- Seep S
- Campsite ▲
- Gill net location X

- Rock ●
- Maximum depth +
- Flow direction
- Log

TILLIE LAKE

CLEARTXT

TIN LAKE

Lake Description: Tin Lake is a shallow lake surrounded by a muddy shore. The visibility is poor (1-2 meters). The shore of the lake is torn up by moose that feed on grass roots. The lake is surrounded by trees on all sides. It is also located approximately 300 meter of Copper Lake and there is a small stream running between the two.

Legal Description: Section 36 Township T. 42 N. Range R. 9 E.
Survey Date: 1 Aug 1994

HABITAT PARAMETERS

PHYSICAL DATA

Surface area (acres) 1.5
Max. depth (m) 3 Lake elevation (ft) 5415 approx.
Water temp surface (8am) 22 C Air temp (8am) 24 C
Water temp (deep) 22 C

Percentage bottom composition of the lake shoreward of the 3m contour lines.

Bedrock (Br)	<u>solid rock outcrop</u>	<u>0</u>
Boulders (Bo)	<u>rocks > 50cm dia.</u>	<u>5</u>
Rubble (Ru)	<u>rocks < 50cm > 4cm dia.</u>	<u>0</u>
Gravel (Gr)	<u>4cm dia. > rocks > .5 cm</u>	<u>0</u>
Sand (SA)	<u>.5cm dia. > rocks > .06 cm</u>	<u>0</u>
Silt (SI)	<u>.06cm dia > particles >.004 cm dia.</u>	<u>95</u>
and Organics		

Shallow littoral zone (<3m), per(%) of lake surface area
100%Major lake inlet(I), or outlet(O)

Stream characteristics	1	2	3	4	5
Inlet(I). outlet(O)	<u>0</u>				
Width (cm)	<u>45</u>				
Depth (cm)	<u>25</u>				
Flow velocity (1-3)	<u>1</u>				
Sand/gravel %	<u>0</u>				
Barrier type	<u>NA</u>				
Potential alluvial spawn	<u>NA</u>				
# of fish observed	<u>0</u>				
number of seeps	<u>-2</u>				

Stream data was collected to 50m from lake shore, or to barrier.

Spawning potential is very low. The presence of small fish is the only indication, if any. The stream bottom is completely covered with silt and organic debris.

BIOLOGICAL DATA

Zooplankton, Shrimp, and Aquatic insects (invertebrates)

Surface collection (hand held dip net)

Order: Hemiptera, Family: Gerridae

Zooplankton sample (deep) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Sub-Order: Calanoida

Class: Crustacea, Order: Cladocera, Family: Daphnidae, Species:
Daphnia spp

Zooplankton sample (shallow) using plankton net sampler

Class: Crustacea, Order: Eucopepoda, Sub-Order: Calanoida

Fish stomach content (obtained from 12 hour gill net set)

Order: Hemiptera, Family: Gerridae (1 specimen)

TERRESTRIAL VEGETATION

Forest percent coverage 20%

Tree species Sub Alpine Fir

Open ground percent 80% Dominant types 75% grass,
25% talus

ANIMAL OBSERVATIONS

Species	visual/track	number	comments
Spotted frog	visual	>10	
Moose	visual	3	2 cows, 1 calf
Bear	track	1	scat found
Common garter	visual	2	

FISHERIES POPULATION DATA

Fish species present in lake (12 hour gill net set and angling)
Rainbow trout, cutthroat trout, rainbow/cutthroat trout hybrids.

Stocking record for the lake:

Date Stocked	Species	# Stocked	# Fish per Surface Acre
1967	RB/CT	182/170	121/113
1969	CT	1584	1056
1972	CT	1050	700
1975	CT	766	510
1978	CT	1000	667
1981	RB/CT	1000	667
1983	CT	606	404
1988	CT	750	500
1989	CT	750	500
1990	RB	750	500
1992	RB	750	500

12 hour gill net results:

Fish caught	Species	Length (cm)			Weight (g)		
		Min.	Max.	Mean	Min.	Max.	Mean
3	RB	12.6	19	15.5	30	90	56
1	CT	26	26	26	160	160	160

#	Cutthroat				Rainbow				Brook Trout				Rainbow Cutthroat Hyb.			
12																
11																
10																
9																
8																
7																
6																
5																
4																
3					*											
2					*											
1		*			*											
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	-- AGE OF FISH BY YEARS --															

Angling:

Number of hours fished 2 Number of fish caught 3

Anglers observed 0 Non-anglers observed 0

Campsite impact: very low, no visible garbage, no horse damage.

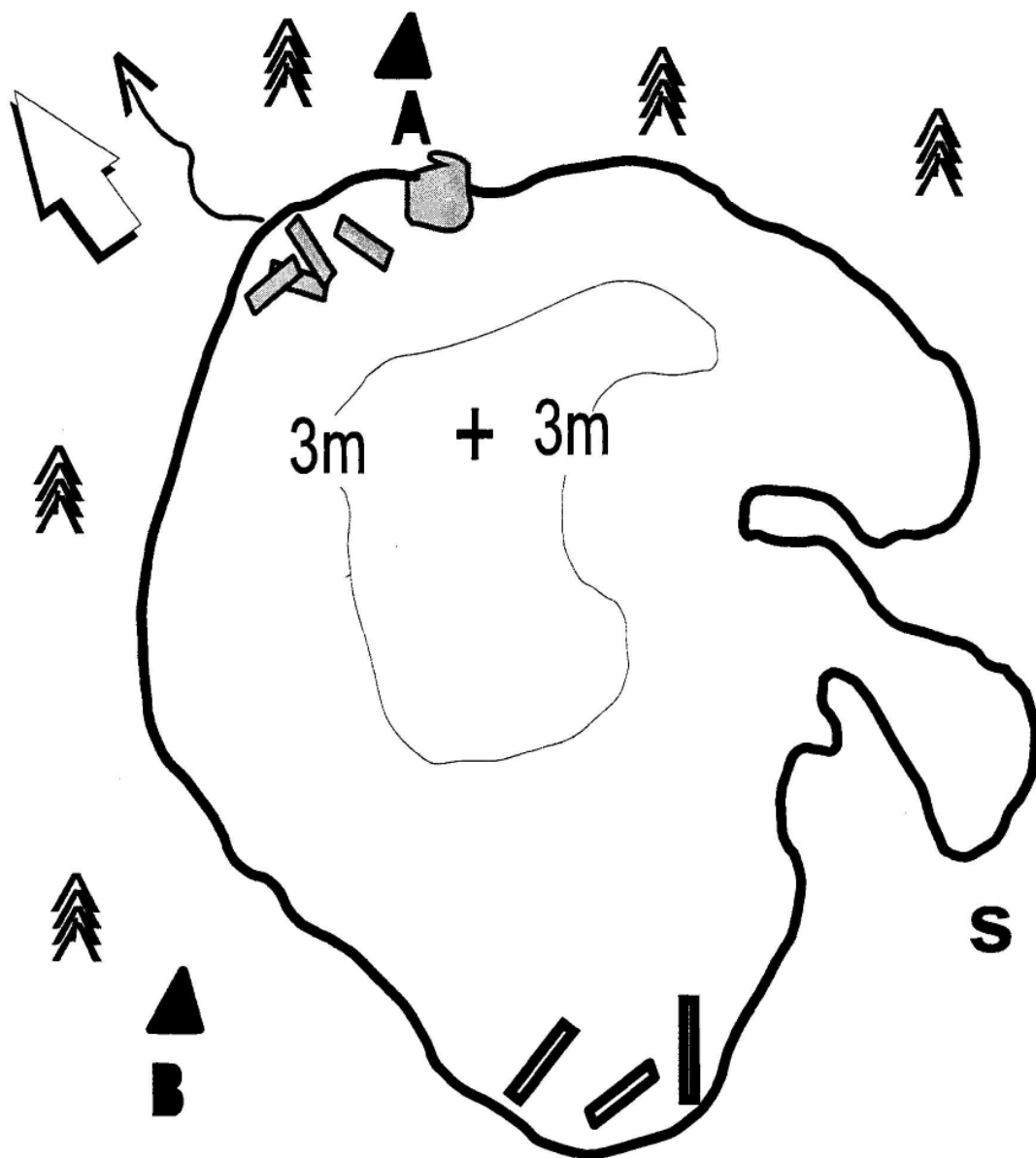
#	Size (m)	Degree of impact (high, mod, low)	Comments
<u>only</u> A	<u>1x1</u>	<u>low</u>	<u>consisting of fire ring</u>
<u>only</u> B	<u>1x1</u>	<u>low</u>	<u>consisting of fire ring</u>
C			
D			

Access difficulty:

Total distance from nearest road(miles) 1.2

Distance on a minor trail 1.2

Distance bushwack 0



• 3 meter contour interval

• Stream

• Seep **S**

• Campsite **B**

• Gill net location

X - - - -
X

• Rock

• Maximum depth **+**

• Flow direction

• Log

TIN LAKE

CLEARTXT

1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project I: Surveys and Inventories

Subproject I-B: Clearwater Region

Job No.: b

Title: Lowland Lakes Investigations

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

Standard survey in Soldiers Meadow Reservoir indicates rainbow trout *Oncorhynchus mykiss* stocked as fingerlings dominate the fish community. Recent illegal introductions of black crappie *Pomoxis nigromaculatus* have established a population. Black crappie are documented to reach lengths in excess of 300 mm and are providing sport fishing opportunity in Soldiers Meadow Reservoir. Game fish dominated the survey, accounting for 98.2% of the sample.

Standard survey in Waha Lake indicates that lowering stocking rates of kokanee *O. nerka kennerlyi* has resulted in larger size kokanee in the fishery. Smallmouth bass *Micropterus dolomieu* are the most abundant game fish in Waha Lake. Game fish made up 100% of the fish community sampled in Waha Lake.

Largemouth bass *M. salmoides* in Spring Valley Reservoir continue to show improvement in both age and size structure as a result of forage introduction.

Authors:

Ed Schriever
Regional Fisheries Biologist

OBJECTIVES

1. Perform standard lowland lake surveys on Soldiers Meadow Reservoir and Waha Lake.
2. Evaluate stock structure of largemouth bass (*Micropterus salmoides*) in Spring Valley Reservoir.

METHODS

We performed fish community surveys using Idaho Department of Fish and Game (IDFG) standard survey procedures (Appendix A).

We sampled fish in lowland lakes using pulsed D.C. current from a portable generator and a Coffelt VVP-2E pulsator. Booms and electrodes were mounted on a 16-foot john boat. All electrofishing took place between 2000 hours and 0200 hours. We sampled trout and kokanee *Oncorhynchus nerka kennerlyi* in lowland lakes with gill nets. We used standard floating experimental gill nets 150 ft long by 6 ft deep with six panels of different size mesh. Mesh sizes were 3/4-in, 1-in, 1-1/4-in, 2-in, and 2-1/2-in. One or two nets were set and fished from late afternoon until early morning. Total net hours were recorded with the catch.

Age and growth estimates were made from scale analysis. Scales were dried and cleaned. Impressions were made in acetate slides using a heated press. Impressions were read on a microfiche reader. Where possible, five scales from each centimeter of the length distribution were read. This age distribution was applied to the total length distribution sample to produce a population age frequency.

Length at age was back-calculated using the formula:

$$L^1 = \frac{C + S^1}{S(L - C)}$$

Where: L = length of fish at time of scale formation

L¹ = length of fish when annulus was formed

S = length of total scale radius

S¹ = length of scale radius to annulus

RESULTS

General

Clearwater Region fishery management personnel, conservation officers, and volunteers checked 569 anglers at nine Clearwater Region lowland lakes and reservoirs in 1994. These anglers had fished 1,247 hours to catch 2,207 game fish, a catch rate of 1.77 fish/h. The catch consisted of 31% trout, 61% kokanee, and 8% warmwater species (Table 1).

Standard Lake Surveys

Soldiers Meadow Reservoir

Soldiers Meadow Reservoir is a 100-acre reservoir located in Nez Perce County 17 miles southeast of Lewiston, Idaho. It was constructed for the Lewiston Orchards Irrigation District (LOID) to retain waters for irrigation purposes. Its primary water supply are Webb and Captain John creeks (Figure 1). Soldiers Meadow Reservoir is located at elevation 4,522 feet mean sea level. Mean depth is 18.2 feet with a maximum depth of 46 feet (Figure 2). Total capacity of Soldiers Meadow Reservoir is 1,819 acre-feet.

Water fluctuations on an annual basis are commonplace. Water reductions usually begin by late June or early July as water is discharged for storage in Mann Lake. Low pool generally occurs during late fall towards the end of the irrigation season (Figure 3). Severity and timing of water level fluctuations is dependent on water yield in the LOID-managed watershed and irrigation demand. The timing of annual variations in water level can have major effects on the spawning success of warmwater species. Also, low pool levels through the winter also have a negative effect on carrying capacity.

Idaho Department of Fish and Game (IDFG) stocks catchable size rainbow trout *Oncorhynchus mykiss* in Soldiers Meadow Reservoir in the spring. Spokane strain fingerling rainbow trout (approximately 60/lb) are stocked in late May. Early spawning kokanee are also stocked in May (approximately 100/lb). In 1993, 15,000 catchable size rainbow trout, 5,000 Spokane rainbow, and 5,000 early spawning kokanee were stocked. Early spawning kokanee were introduced into Soldiers Meadow Reservoir to provide a troll fishery.

Statewide general fishing regulations apply for all species at Soldiers Meadow Reservoir.

Table 1. Summary of creel survey findings for Clearwater Region lowland lakes and reservoirs, 1994.

Lowland lake	Anglers	Total hours	RBT	KOK	LMB	SMB	CRA	BG	CAT	Total	CPUE
Spring Valley Res.	175	324	293	0	19	0	6	33	0	350	1.08
Winchester Lake	82	182.5	108	0	0	0	0	0	0	108	0.59
Campbells Pond	19	37	52	0	0	0	0	0	0	52	1.41
Robinson Pond	11	21	36	0	0	0	0	0	0	36	1.71
Elk Creek Res.	22	46.5	40	0	1	0	0	1	0	42	0.90
Moose Creek Res.	67	124	71	0	6	0	0	10	0	87	0.70
Dworshak Res.	167	460.5	6	1353	0	110	0	0	0	1469	3.19
Total	576	1,228	667	1353	26	110	6	44	0	2207	1.77

RBT = rainbow trout
SMB = smallmouth bass
CAT = catfish
CRP = crappie

KOK = kokanee
CRA = crappie
BG = bluegill
LMB = largemouth bass

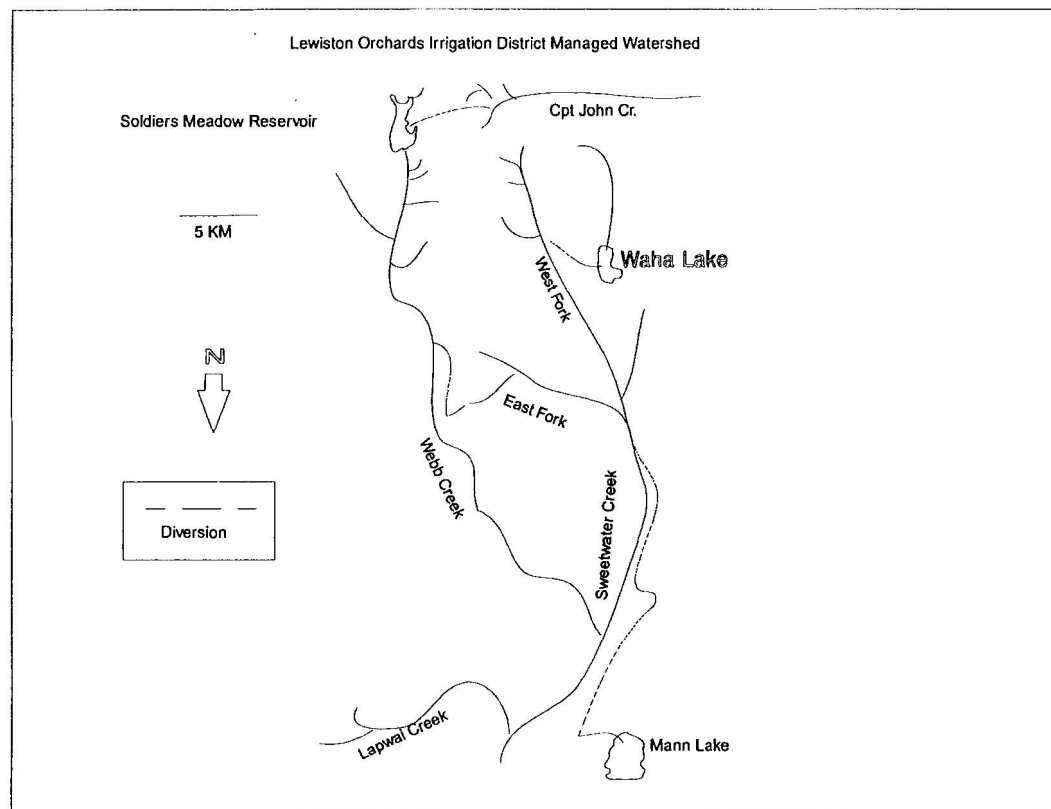


Figure 1. Lewiston Orchards Irrigation District watershed schematic.

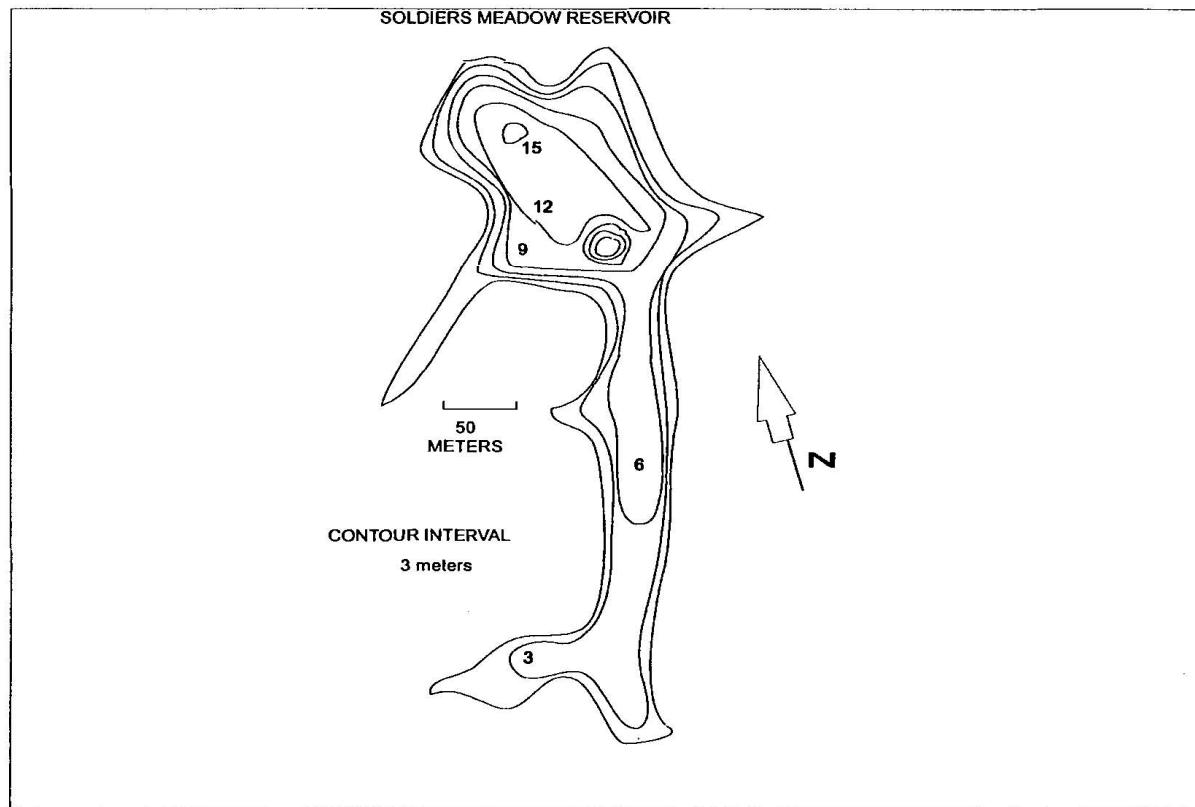


Figure 2. Bathymetric map of Soldiers Meadow Reservoir, Nez Perce County, Idaho.

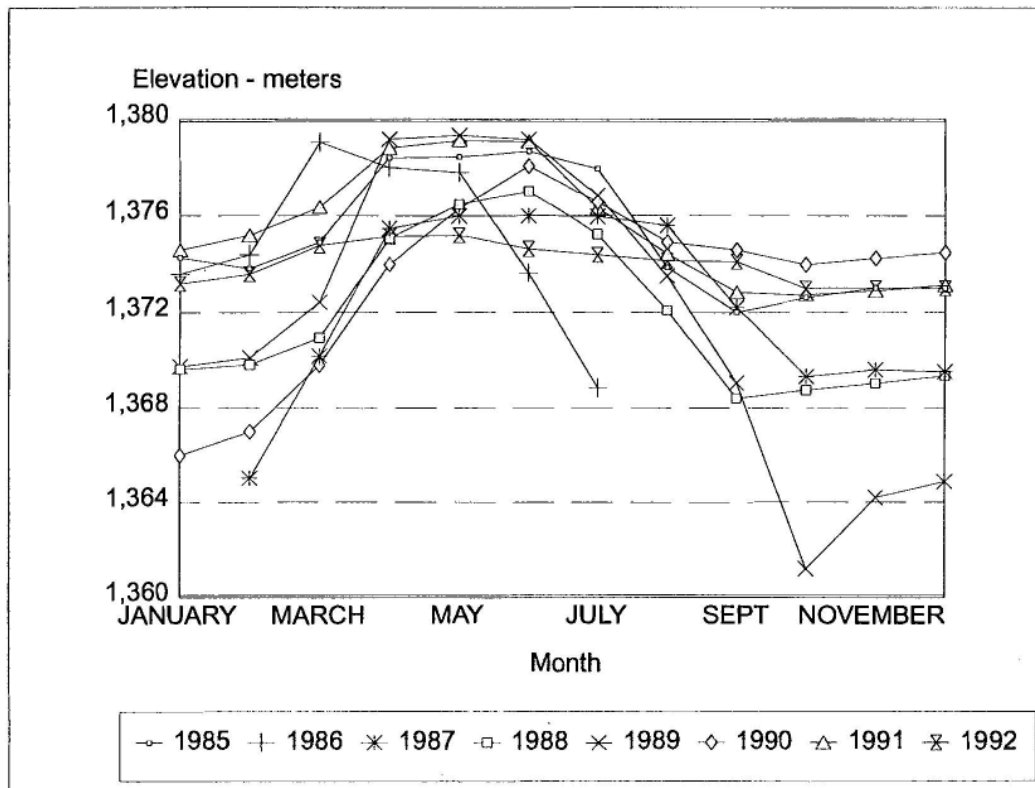


Figure 3. Annual water level fluctuations in Soldiers Meadows Reservoir, Nez Perce County, Idaho.

We found three species of game fish represented in our sample: black crappie *Pomoxis nigromaculatus*, early spawning kokanee, and rainbow trout. Black crappie are a recent illegal introduction. The only species of nongame fish we found is longnosed dace *Rhinichthys cataractae*.

Three species of game fish combined to produce 98.2% of the total catch and 99.8% of the catch biomass. Rainbow trout stocked at catchable size were not included in the total catch calculations. Black crappie represented 16.6% of the total catch and 24.3% of the total catch biomass in our sample (Table 2). Relative weights (Wr) for black crappie ranged from the low 100's to the high 120% range (Table 3). Proportional stock density (PSD) for black crappie at Soldiers Meadow Reservoir is 61%. Back-calculated lengths at annuli indicate that four years are required to grow a 254 mm (10 inch) black crappie in Soldiers Meadow Reservoir (Table 4). Black crappie are desirable to anglers and they are documented to reach 305 mm (12 inches) in Soldiers Meadow Reservoir.

In our standard survey, kokanee represented 4.3% of the total catch and 6.8% of the catch biomass (Table 2). Annual stocking rates of kokanee have been reduced at Soldiers Meadow Reservoir since 1991 in an attempt to increase the average size of kokanee available to anglers. Sampling in September 1994 indicated the average size of kokanee to be 332 mm. This represents a 110 mm increase in average size from 1990 sampling. Relative weights (Wr) indicate kokanee are in relatively good condition at Soldiers Meadow Reservoir (Table 5).

Spokane strain rainbow trout represented 77.3% of our total catch and 68.6% of the total catch biomass (Table 2). Spokane rainbows are the largest portion of the fish community at Soldiers Meadow Reservoir. Relative weights for Spokane rainbow trout range from the low 70's to the low 90% range (Table 6). Presumably, these adipose-clipped fish were members of a 1992 or 1993 stocking. Total lengths in our sample ranged from 180-260 mm (7 to 10 inches, Table 6).

Waha Lake

Waha Lake is a 93.7-acre, naturally-formed impoundment located in Nez Perce County approximately ten miles southeast of Lewiston, Idaho. It is the deepest of the region's lowland lakes, with a mean depth of 64.5 feet and a maximum depth of 109 feet (Figure 4). Waha Lake is located at an elevation of 3,389 feet mean sea level.

The water level at Waha Lake is managed by LOID. Its primary inlet is created by a LOID diversion dam located on the West Fork of Sweetwater Creek (Figure 1). Waha Lake requires more time to reach full pool because of its greater volume. Subsequently, full pool may not be reached until June in most years. Minimum pool usually occurs around January as the water level is reduced by subsurface outflow and pumping for summer irrigation (Figure 5).

Table 2. Soldiers Meadow Reservoir standard survey findings of fish community characteristics, May 16, 1994.

Species	Length range (mm)	Catch per unit of combined gear sampling efforts ¹			
		Number	%	Weight (kg)	%
Game fish					
Black crappie	100-330	73.5	16.6	11.8	24.3
Kokanee	210-300	19.0	4.3	3.3	6.8
Spokane rainbow	190-260	341.5	77.3	33.3	68.6
	Subtotal	434.0	98.2	48.4	99.8
Nongame fish					
Longnosed dace	100-120	8.0	1.8	0.1	0.2
All species total:		442.0	100.0	48.5	100.0

e ¹One hour elctrofishing, one trap net night, and one combined floating and sinking gill net night.

Table 3. Catch composition of black crappie from Soldiers Meadow Reservoir standard survey, May 16, 1994.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (gm)	Relative weight	Age(s)
50	0	0	0	0	
60	0	0	0	0	
70	0	0	0	0	
80	0	0	0	0	
90	0	0	0	0	
100	2	2.7	16.0	115	1+
110	0	0	0	0	
120	2	2.7	25.0	100	1+
130	0	0	0	0	
140	0	0	0	0	
150	0	0	0	0	
160	14.0	19.0	67.4	107	2+
170	2.5	3.4	90.0	117	3+
180	10.0	13.6	93.8	101	3+
190	15.0	20.4	117.5	107	3+
200	15.5	21.1	147.4	113	3+
210	0	0	0	0	--
220	0	0	0	0	--
230	0	0	0	0	--
240	0	0	0	0	--
250	2.5	3.4	330.0	122	3+
260	5.0	6.8	390.0	127	3+
270	2.5	3.4	430.0	124	3+
280	0	0	0	0	--
290	0	0	0	0	--
300	0	0	0	0	--
310	0	0	0	0	--
320	0	0	0	0	--
330	2.5	3.4	700.0	105	5+

Table 4. Back-calculated length at annuli of black crappie from Soldiers Meadow Reservoir standard survey, May 16, 1994.

Age group	Number aged	Backcalculated length (mm) at each annulus							Length at capture
		I	II	III	IV	V	VI	VII	
I	2	60.8	0	0	0	0	0	0	112.5
II	5	66.5	117.4	0	0	0	0	0	162.2
III	18	77.9	141.5	185.4	0	0	0	0	209.1
IV	0	0	0	0	0	0	0	0	0
V	1	121.7	207.2	243.0	262.3	303.7	0	0	334.0
VI	0	0	0	0	0	0	0	0	0
VII	0	0	0	0	0	0	0	0	0
Average length		76.0	139.2	188.5	262.3	303.7	0	0	--
Number aged		26	24	19	1	1	0	0	--

Table 5. Catch composition of kokanee from Soldiers Meadow Reservoir standard survey, May 16, 1994.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (gm)	Relative weight	Age(s)
180	0	0	0	0	--
190	0	0	0	0	--
200	0.5	2.6	--	--	--
210	2.5	13.2	103.0	105	1+
220	0	0	0	0	--
230	0	0	0	0	--
240	0.5	2.6	103.0	71	2+
250	0	0	0	0	--
260	1.5	7.9	--	--	--
270	4.0	21.1	204.4	99	2+
280	5.5	28.9	212.0	92	2+
290	4.0	21.1	236.0	93	2+
300	0.5	2.6	204.0	73	2+

Table 6. Catch composition of Spokane strain rainbow trout from Soldiers Meadow Reservoir standard survey, May 16, 1994.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (gm)	Relative weight	Age(s)
150	0	0	0	0	0
160	0	0	0	0	0
170	0	0	0	0	0
180	6.0	1.8	--	--	--
190	32.0	9.4	59.0	72	--
200	79.0	23.1	86.6	91	--
210	98.5	28.8	101.4	92	--
220	81.5	23.8	110.0	87	--
230	26.0	7.6	113.3	79	--
240	8.5	2.5	130.0	80	--
250	8.0	2.3	149.0	81	--
260	2.5	0.7	186.0	91	--

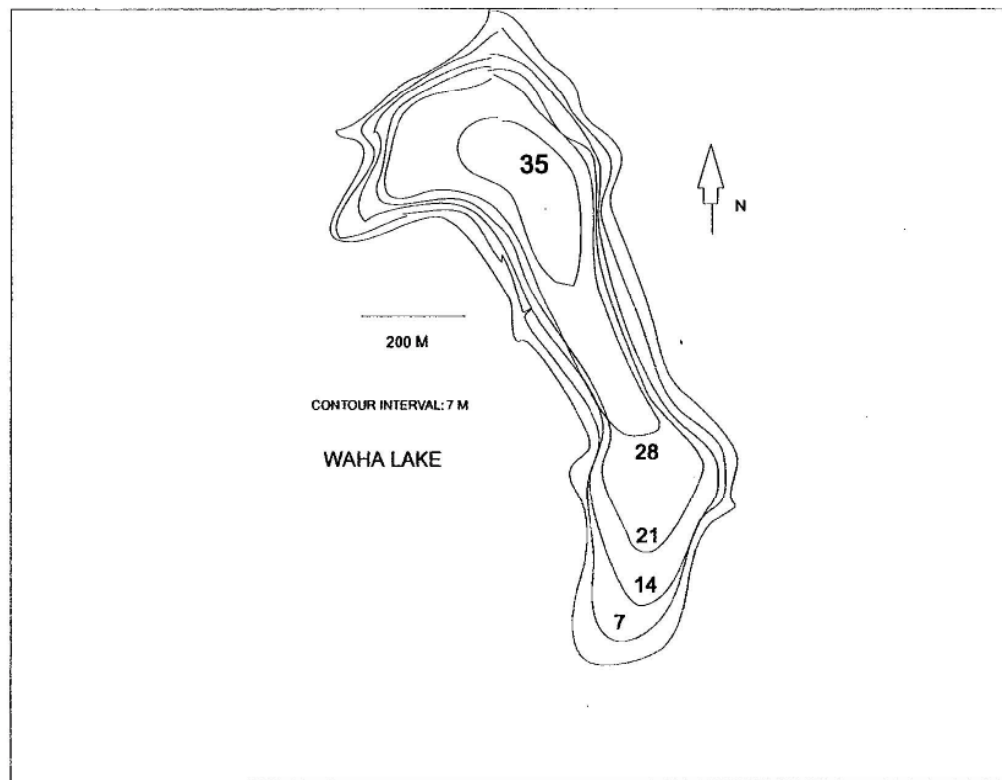


Figure 4. Bathymetric map of Waha Lake, Nez Perce County, Idaho.

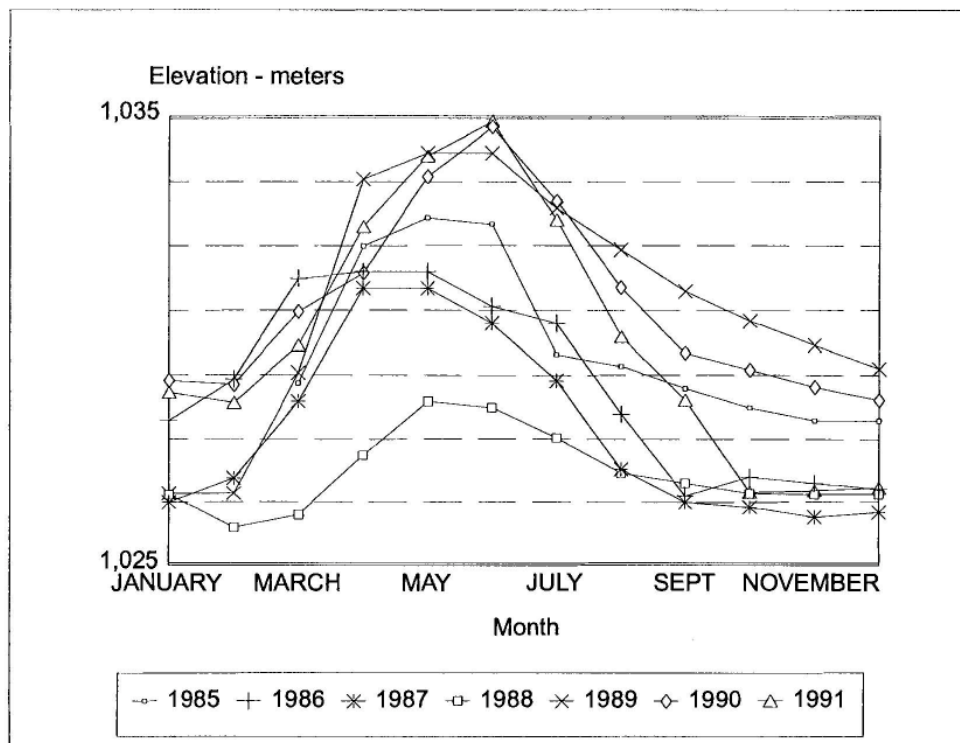


Figure 5. Annual water level fluctuations in Waha Lake, Nez Perce County, Idaho.

Trout and kokanee populations are maintained by stocking. IDFG stocks catchable size rainbow trout in the spring. Spokane strain fingerling size rainbow trout are stocked in the spring (approximately 60/lb). Early spawning kokanee are also stocked in the spring (approximately 100/lb). Other species present in the lake are smallmouth bass *Micropterus dolomieu* and yellow perch *Perca flavescens*. Yellow perch were illegally introduced in the fall of 1994.

Waha Lake is open year-round and general statewide regulations apply to all fish species.

We performed a standard lake survey on Waha Lake on May 19, 1994. Three species of game fish made up 100% of the total catch. Smallmouth bass were the most abundant game fish accounting for 58% of the total catch and 70.7% of the catch biomass. Spokane strain rainbow trout accounted for 39.1% of the total catch and 28.6% of the catch biomass. Early spawning kokanee represented less than 1% of the total catch (Table 7). Catchable size rainbow trout were not included in the total catch because they were stocked just prior to the survey. Nongame fish were not present in our sample at Waha Lake.

Relative weights for smallmouth bass ranged from the low 70's to the low 100% range (Table 8). This represents a 6.1% increase compared to data collected in 1990 from Waha Lake. PSD for smallmouth bass was 21. This is fairly consistent with the 1990 data (PSD=20). Age 1 and 2 fish were not represented in the sample. This could possibly be due to sampling bias or poor recruitment in 1992 and/or 1993. Back-calculated length at annuli indicates that five years are required to produce a 254 mm (10 inch) smallmouth bass in Waha Lake (Table 9).

Relative weights for Spokane rainbow trout ranged from the mid-80's to low 90% (Table 10). In 1993, IDFG stocked 15,000 fingerling Spokane strain rainbow trout in Waha Lake with adipose fin clips. Most fish in our sample were in the 180 to 260 mm range (Table 10). There were no fish between 270 and 380 mm; however, one fish in our sample was 390 mm. This could relate to an inability for fish greater than 260 mm to switch to a larger forage item.

Only two kokanee were represented in the catch. Relative weights were 71% and 88%, respectively (Table 11). IDFG stocked 5,000 early spawning kokanee in the spring of 1993. Stocking numbers were decreased in an effort to shift maturity from 2+ to 3+ fish to provide a larger average kokanee in the fishery. The average size kokanee in September 1994 was 253 mm.

Spring Valley Reservoir

Through the 1980s, Spring Valley Reservoir has maintained a largemouth bass population with a less than ideal size and age structure. In the 1970s, largemouth bass were probably foraging on fingerling rainbow trout as thousands were stocked annually. In the 1980s, the trout program shifted to the use of primarily catchable size rainbow trout, thus eliminating the only large forage item for largemouth bass in Spring Valley Reservoir. As a consequence, bass growth rates declined

Table 7. Waha Lake standard survey findings of fish community characteristics, May 19, 1994.

Species	Catch per unit of combined gear sampling efforts ¹				
	Length range (mm)	Number	%	Weight (kg)	%
Game fish					
Smallmouth bass	140-430	40.6	58.0	9.4	70.7
Spokane rainbow	180-390	27.4	39.1	3.8	28.6
Kokanee	190-200	2.0	2.9	0.1	0.8
	Subtotal	70.0	100.0	13.3	100.0
Nongame fish	--	0	0	0	0
	All species total:	70.0	100.0	13.3	100.0

¹One hour electrofishing, one trap net night, and one combined floating and sinking gill net night.

Table 8. Catch composition of smallmouth bass from Waha Lake standard survey, May 19, 1994.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (gm)	Relative weight	Age(s)
120	0	0	0	0	0
130	0	0	0	0	0
140	1.4	3.4	30.0	72	3+
150	0	0	0	0	0
160	0	0	0	0	0
170	2.8	6.9	62.5	84	3+
180	4.2	10.3	77.3	88	3+
190	1.4	3.4	74.0	72	3+
200	5.6	13.8	98.3	82	3+
210	1.4	3.4	110.0	79	3+
220	4.2	10.3	135.0	85	3+
230	2.8	6.9	155.0	85	3+
240	1.4	3.4	110.0	79	3+
250	2.8	6.9	275.0	93	4+
260	0	0	0	0	0
270	2.8	6.9	191.0	82	3+
280	0	0	0	0	0
290	1.4	3.4	330.0	90	5+
300	1.4	3.4	510.0	126	5+
310	0	0	0	0	0
320	4.2	10.3	455.0	93	6+
330	1.4	3.4	510.0	95	7+
...					
...					
430	1.4	3.4	1,210.0	101	8+

Table 9. Back-calculated length at annuli of smallmouth bass from Waha Lake standard survey, May 19, 1994.

Age group	Number aged	Backcalculated length (mm) at each annulus							Length at capture
		I	II	III	IV	V	VI	VII	
I	0	0	0	0	0	0	0	0	0
II	0	0	0	0	0	0	0	0	0
III	14	52.2	107.0	157.5	0	0	0	0	204.4
IV	2	54.4	121.9	169.5	218.9	0	0	0	274.0
V	2	48.3	98.8	150.0	184.7	234.2	0	0	299.0
VI	1	52.4	110.9	161.9	207.4	255.2	287.4	0	323.0
VII	1	46.2	80.8	117.7	163.9	207.7	246.9	295.4	330.0
Average length		51.5	105.8	155.4	195.9	237.5	278.6	313.6	--
Number aged		22	22	22	8	6	4	2	--

Table 10. Catch composition of Spokane strain rainbow trout from Waha Lake standard survey, May 19, 1994.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (gm)	Relative weight	Age(s)
180	5.2	19.0	62.5	89	--
190	2.8	10.2	74.0	90	--
200	0	0	0	0	--
210	0	0	0	0	--
220	2.4	8.8	111.0	88	--
230	5.6	20.4	130.0	91	--
240	1.4	5.1	142.0	87	--
250	5.6	20.4	158.5	87	--
260	3.4	12.4	194.7	95	--
...					
...					
390	1.0	3.6	570.0	84	--

Table 11. Catch composition of kokanee from Waha Lake standard survey, May 19, 1994.

Length range (mm)	No. per unit effort	Percent of sample	Mean weight (gm)	Relative weight	Age(s)
190	1.4	50.0	52.0	71	1+
200	1.4	50.0	75.0	88	2+

and few fish over 200 mm were present in the reservoir. As a response to small bass, no size limit was imposed on largemouth bass in Spring Valley Reservoir.

In 1989, bluegill *Lepomis macrochirus* were stocked in Spring Valley Reservoir to provide forage for largemouth bass.

In 1990 and 1991, tiger muskie *Esox lucius x E. masquinongy* were stocked in low numbers to prey on overabundant largemouth bass. Both bluegill and tiger muskie will also provide diversity to the fishery in Spring Valley Reservoir.

Largemouth Bass-In 1994, we removed 224 largemouth bass less than 260 mm from Spring Valley Reservoir. These fish were given to area residents to stock their small farm ponds. In 1992, we imposed a 12 inch minimum size limit on largemouth bass in Spring Valley Reservoir.

We collected and measured 264 largemouth bass in Spring Valley Reservoir on May 25, 1994 (Table 12). The length distribution shows great improvement since the early 1980s when less than 1% of largemouth bass sampled were greater than 300 mm. The percent of bass over 300 mm increased from 4.5 to 8.4 between 1992 and 1994.

Bluegill-We measured 300 bluegill from collection efforts on Spring Valley Reservoir (Table 13). We also gave away 404 bluegill to local farm pond owners for stocking.

Tiger Muskie-No tiger muskie were sampled in 1994.

Black Crappie-We collected 17 black crappie during our sampling. These fish are present as a result of an illegal introduction to Spring Valley Reservoir.

Table 12. Length frequency of largemouth bass from Spring Valley Reservoir, 1983-1994.

Length (mm)	9/22/83	9/26/84	1988	6/18/91	5/22/92	5/21/93	5/25/94
50	2	0	3	0	9	16	0
60	2	0	0	0	8	55	0
70	1	0	0	0	8	89	0
80	1	0	2	1	5	44	8
90	8	0	8	0	1	6	31
100	28	0	23	0	0	1	45
110	40	5	31	2	0	0	35
120	54	4	19	1	2	16	26
130	37	4	18	1	6	33	10
140	21	18	9	9	11	61	11
150	13	29	2	27	15	48	24
160	6	33	2	39	9	31	37
170	2	14	5	30	19	15	28
180	0	12	6	19	15	7	17
190	1	9	6	12	3	7	14
200	4	4	5	20	6	3	4
210	4	0	4	75	11	5	6
220	0	0	2	110	19	3	5
230	0	0	0	55	29	5	6
240	2	1	0	10	26	0	5
250	1	0	1	9	22	1	1
260	1	0	0	4	14	0	2
270	2	0	0	0	9	0	1
280	1	0	0	0	3	0	1
290	0	0	0	0	2	1	0
300	0	0	0	0	3	0	1
310	0	1	0	0	0	2	1
320	0	0	0	0	2	1	3
330	0	0	0	0	0	3	1
340	0	0	0	0	3	3	2
350	0	0	0	0	0	4	2
360	0	0	0	0	2	5	1
370	0	0	0	0	0	1	2
380	0	0	0	0	0	0	1
390	0	0	0	1	0	2	4
400	0	0	0	0	0	0	4
410	0	0	0	0	0	0	3
420	0	0	0	0	0	0	4
430	0	0	0	0	0	0	0
440	0	0	0	0	0	0	0
450	0	0	0	0	0	0	0
460	0	0	0	1	1	0	0
470	0	0	0	1	0	0	0
480	0	0	0	0	1	0	0
490	0	0	0	0	0	0	0
500	1	0	0	0	0	0	0
Number	232	134	146	427	264	468	346
Ave. length	128.92	158.96	129.01	202.60	199.02	123.60	160.80
PSD	6	17	0	1	8	54	48
% ≥200 mm	6.9	4.5	8.2	67.0	58.0	8.3	17.3
% ≥300 mm	0.4	0.8	0	0.7	4.5	4.5	8.4

Table 13. Length frequency of fish sampled at Spring Valley Reservoir, May 25, 1994.

Length range (mm)	Crappie	Largemouth bass	Bluegill
50	0	0	1
60	0	0	4
70	0	0	23
80	0	8	40
90	0	31	66
100	0	45	49
110	0	35	20
120	0	26	8
130	0	10	17
140	0	11	18
150	0	24	23
160	3	37	14
170	6	28	5
180	6	17	8
190	2	14	4
200	0	4	0
210	0	6	0
220	0	5	0
230	0	6	0
240	0	5	0
250	0	1	0
260	0	2	0
270	0	1	0
280	0	1	0
290	0	0	0
300	0	1	0
310	0	1	0
320	0	3	0
330	0	1	0
340	0	2	0
350	0	2	0
360	0	1	0
370	0	2	0
380	0	1	0
390	0	4	0
400	0	4	0
410	0	3	0
420	0	4	0
430	0	0	0
440	0	0	0
450	0	0	0
Number	17	346	300
% ≤ 300 mm	100	92	100
% of total sample	2.6	52.2	45.2
PSD	0	48.3	19.9

APPENDIX

Appendix A. Fish community survey procedures and guidelines.

LOWLAND LAKES AND RESERVOIRS
STANDARD FISH COMMUNITY SURVEY PROCEDURES, CORE DATA, AND
REPORT GUIDELINES

I. Surveys will be conducted using the following standardized gear:

A. Gill Nets

Floating and sinking monofilament nets, 150' x 6', with six panels composed of 3/4", 1", 1-1/4", 2", and 2-1/2" bar mesh. One floating and one sinking net combined fished overnight equals one unit of gill net effort.

B. Trap Nets

75' lead, 3' x 6' frame, crowfoot throats on first and third of five hoops, 3/4" bar mesh, treated black. One trap net fished overnight equals one unit of trap net effort.

C. Electrofishing

A pulsed D.C. electrofishing boat with boom-mounted electrodes. One hour of current-on electrofishing equals one unit of electrofishing effort.

II. Surveys will be conducted using the following procedures.

A. Effort

Due to the selectivity of individual gear types, a combination of gill netting, trap netting, and electrofishing effort will be used to characterize the fish community. One unit of effort for each of the gear types combined, equals one unit of "sampling effort". The following table provides guidelines for the minimum amount of sampling effort and survey time needed for various size waters:

Lake size (ac)	*Units of sampling effort	Nights needed
1 - 25	1	1
26 - 100	2	1
101 - 500	4	1-2
501 - 1,000	6	2
**1,000+	6+	2-3+

*one unit of "sampling effort" includes a pair of floating and sinking gill nets and one trap net fished overnight and one hour of electrofishing.

**use best judgement on sampling effort needed to sample various habitat zones.

1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project I: Surveys and Inventories

Subproject I-B: Clearwater Region

Job No.: c

Title: Rivers and Streams Investigations

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

Clearwater Region personnel snorkeled 133 stream transects within the Clearwater, Snake, and Salmon River drainages. Chinook salmon *Oncorhynchus tshawytscha* juvenile numbers continued to be low throughout the drainages sampled. Only 28 adult chinook salmon redds were counted in traditional transects in 1994.

The Selway River steelhead trout *O. mykiss* broodstock program entered its second year. Thirty-one adult fish were collected in 1994, yielding 101,000 eggs to the program. The first releases of offspring were made into Crooked River. Approximately 72,000 juveniles were released along with a 104,000 companion group of hatchery origin fish.

Two hundred and three hatchery origin rainbow/steelhead trout were collected from the three main rivers within the region. Diet analysis revealed only one unidentified fish in the 203 stomachs.

Management personnel captured and tagged 105 white sturgeon *Acipenser transmontanus* from the Snake River and two from the Salmon River with Passive Integrated Transponder (PIT) tags.

Rainbow trout were the most abundant fish observed throughout the North Fork Clearwater River drainage. Kokanee salmon *O. nerka kennerlyi* spawner numbers in the drainage were the second highest on record.

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OBJECTIVES

1. Develop long-term fish population database on selected streams throughout the Clearwater Region.
2. PIT tag white sturgeon *Acipenser transmontanus* in the Snake River below Hells Canyon Dam and the Salmon River below Riggins.
3. Assess diet of hatchery rainbow trout *Oncorhynchus mykiss* and residualized hatchery steelhead trout smolts in the Snake River, Salmon River, and Clearwater River drainages.
4. Collect adult steelhead trout from the Selway River to provide smolts for rebuilding steelhead trout populations in the South Fork Clearwater River drainage.
5. Allocate hatchery rainbow trout in regional streams.
6. Collect miscellaneous creel census information from various streams throughout the region.

SALMONID POPULATION TREND MONITORING

Methods

We used standard snorkeling techniques to monitor fish densities in regional rivers and streams. Snorkeling was conducted in late summer when stream flows were low, clear, and accessible. Small streams were snorkeled upstream with one to six observers depending on stream width. Larger streams and river corridors were snorkeled free-floating downstream with four to six observers depending on corridor width. Population abundance is presented as fish per 100 m².

Six streams within the Potlatch River drainage were electroshocked in conjunction with the Idaho Division of Environmental Quality.

Results

Selway River

Juvenile chinook salmon *O. tshawytscha* numbers remained low in the tributaries (Table 1) and mainstem river (Table 2). A total of 117 chinook salmon juveniles were observed in 18

Table 1. Summary of fish densities (per 100 m²) as determined by snorkeling the Selway River drainage, 1994.

Stream	Date	Steelhead trout					Cutthroat trout			Chinook salmon	Mountain whitefish	Bull trout
		Total	Age 0	Age 1	Age 2	Age >2	Total	<305 mm	>305 mm			
Bear Creek, at bridge	7/28	3.75	0.38	1.35	1.92	0.10	1.16	0.87	0.29	0.77	4.42	0
Bear Creek, upper	7/28	1.46	0.84	0.31	0	0.31	0	0	0	0	0	0
E.F. Moose Creek	7/30	3.08	1.95	0.97	0.16	0	1.78	1.46	0.32	0.65	0.80	0
Moose Creek, at mouth	7/30	9.58	0	4.48	4.74	0.36	0.82	0.31	0.51	0	2.15	0
Moose Creek, at E.F. confl.	7/30	1.11	0.39	0.72	0	0	0	0	0	0	0	0
N.F. Moose Creek	7/30	10.39	3.34	2.91	3.30	0.84	2.00	1.42	0.58	1.36	1.68	0
Marten Creek	8/1	14.84	2.70	8.77	2.70	0.67	1.34	0.67	0.67	0	0	0
Little Clearwater R., upper	7/22	4.13	0	2.64	1.49	0	1.33	0.83	0.50	0.99	0	0
Little Clearwater R., lower	7/22	2.44	0	2.03	0.41	0	0.81	0.81	0	0.81	0	0.41
Otter Creek	8/2	19.00	1.68	12.29	5.03	0	12.86	8.39	4.47	3.35	0	0
Running Creek, lower	7/27	2.48	1.31	0.44	0.58	0.15	1.02	0.87	0.15	0	0.15	0
Running Creek, upper	7/27	6.09	0	1.44	4.01	0.64	0.48	0.16	0.32	0	0.64	0
Selway R. at Hell's-Half	7/21	2.78	0.19	2.50	0.09	0	1.02	1.02	0	2.31	0	0
Selway R. at Little Clearwtr.	7/21	3.10	1.51	1.43	0.16	0	0.56	0.32	0.24	7.00	0.95	0.24
Selway R. at Beaver Pt.	7/21	2.32	0.45	1.52	0.30	0.05	0.20	0.20	0	2.38	0.30	0
Deep Creek, lower	7/21	5.44	1.36	3.63	0.45	0	4.23	4.23	0	0	0	0.15
Deep Creek, upper	7/21	1.46	0.84	0.31	0	0.31	0	0	0	0	0	0
Three Links Creek	8/1	21.77	5.59	9.42	6.47	0.29	2.36	1.77	0.59	5.00	0	0
White Cap Creek, lower	7/22	3.54	0	2.09	1.09	0.36	3.18	2.36	0.82	0.36	1.27	0.18
White Cap Creek, middle	7/22	3.92	0.09	1.89	0.85	0.09	1.23	1.04	0.19	0.38	0.75	0.19
White Cap Creek, upper	7/22	4.43	1.34	2.39	0.63	0.07	1.97	1.97	0	3.16	0.42	0.14

Table 2. Number of fish counted in snorkel transects (5 snorkelers) in the unroaded mainstem Selway River, 1992-1994.

Location	Year	Cutthroat trout		Steelhead trout				Chinook salmon	Mountain whitefish
		<305 mm	>305 mm	Age 0	Age 1	Age 2	Age >2		
at Bad Luck Creek	1992	30	14	0	0	0	0	0	106
	1993	14	12	9	6	1	0	0	40
	1994	10	7	0	0	0	0	20	23
at North Star Creek	1992	22	2	0	0	0	0	0	56
	1993	28	5	0	0	0	0	0	45
	1994								
at Osprey Island	1992	8	8	0	2	0	0	0	32
	1994	15	5	0	6	3	0	0	56
at Big Bend	1993	13	7	0	0	0	0	0	32
	1994	9	2	0	4	0	0	4	31
at Tango Creek	1992	15	26	0	16	9	0	14	50
	1993	28	1	3	32	2	0	0	26
	1994	28	8	2	29	44	18	3	34

tributary transects and 201 were observed in eight mainstem transects. No adult chinook salmon were observed in the July and August sampling. Aerial chinook salmon spawning ground counts revealed 18 redds, mostly in the upper reaches of the river (Table 3).

Eleven bull trout *Salvelinus confluentus* were observed during the snorkeling activities in July and August. Three of these fish were observed in the mainstem Selway River near Little Clearwater River and the remaining eight were found in various tributaries (Table 1). Historic snorkel comparisons are found in Appendix A.

Relatively high mainstem water temperature ($>25^{\circ}\text{C}$) appeared to influence the distribution of fish within the main river channel. The total number of cutthroat trout *O. clarki* captured by angling was the lowest recorded over the period of record (Table 4). Average cutthroat trout length still remained around 255 mm (Table 5). No cutthroat trout over 305 mm were observed in mainstem transects downstream of Moose Creek (Table 6). Some were observed by incidental snorkeling, but only at the mouths of small cooler tributaries.

Tables 7, 8, and 9 depict historic relative densities of cutthroat trout, steelhead trout, and mountain whitefish *Prosopium williamsoni* observed by snorkeling in mainstem transects.

Lochsa River

Fish densities (per 100 m^2) as determined by snorkeling 14 transects in the Lochsa River drainage are shown in Table 10. Twenty-six chinook salmon juveniles were observed in the six tributaries surveyed and nine were found in one mainstem Lochsa River transect.

Only one bull trout was observed in the 14 transects. Historic snorkeling comparisons are found in Appendix A.

Chinook salmon spawning ground counts revealed 13 redds in Crooked Fork Creek (Table 11).

Snake River

Chinook salmon juveniles were observed while snorkeling in two Snake River tributaries surveyed (Table 12). One bull trout was observed in Sheep Creek. Historic snorkeling comparisons are found in Appendix A.

Table 3. Chinook spawning ground survey summary in the Selway River drainage, 1994.

Drainage	Reach	Type ¹	Description	Date	Method	Redds	-----Fish-----	
							Live	Dead
White Cap Cr.	WC-1	T	Mouth to Coopers Flat	9/11	Aerial	2	0	0
Bear Creek	WC-2	T	Mouth to Cub Creek	9/11	Aerial	9	1	0
Moose Creek	WC-3	T	Mouth to Cedar Creek	9/11	Aerial	0	0	0
Running Creek	WC-4	T	Mouth to two miles above Eagle Cr. and lower one mile of Eagle Cr.	9/11	Aerial	0	0	0
Selway	WC-5	T	Thompson Flat to Magruder RS	9/11	Aerial	1	0	0
Selway	WC-6	T	Magruder RS to Magruder Crossing	9/11	Aerial	1	0	0
Selway	WC-7	T	Magruder Crossing to Little Clearwater River	9/8 9/11	Ground Aerial	3 1	2 0	1 0
Selway	WC-8	T	Little Clearwater to White Cap Creek	9/11	Aerial	1	0	0
Selway	WC-9	T	White Cap Cr. to Bear Creek	9/11	Aerial	4	0	0
Selway drainage aerial count total:						18		

¹T = traditional transect

Table 4. Percent of cutthroat trout by 50.8 mm (2 inch) size groups sampled in the Selway River by angling, 1975-1994

Length (mm)	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990	1992	1993	1994
102 to 151	8.7	2.2	8.7	0.8	4.6	2.8	4.2	2.4	12.4	0.1	4.3	2.7	1.5
152 to 202	31.3	16.4	20.9	20.7	13.6	19.0	22.2	15.8	14.0	22.7	23.3	13.0	12.6
203 to 253	27.0	24.8	24.5	15.7	22.2	25.2	28.2	23.3	25.1	16.5	23.6	20.2	22.3
254 to 304	21.0	35.7	27.0	34.1	30.7	31.2	24.7	27.1	24.3	26.2	30.6	36.8	22.8
305 to 355	11.2	18.4	17.0	23.2	25.3	18.9	16.8	28.0	21.0	25.7	15.7	22.8	34.0
356 to 405	0.8	2.5	1.3	5.1	3.4	2.3	3.8	3.1	3.0	4.7	2.7	4.5	7.4
Over 405	0	0	0.6	0.4	0.2	0.6	0	0.3	0.2	0.5	0	0	0
Number of cutthroat measured	233	238	229	470	352	549	429	322	506	816	301	377	215

Table 5. Comparison of cutthroat trout counted in snorkel transects (1 snorkeler) and cutthroat trout caught by angling in the Selway River between White Cap Creek and Race Creek, 1975-1994.

Year	Counted in snorkel transects		Total no. CT measured	Caught by angling	
	Average no. of CT counted/ transect	Percent CT >305 mm in transects		Average CT total length (mm)	Percent CT caught >305 mm
1994	5.9	11	215	272	29
1992	5.4	28	301	251	18
1990	10.5	19	816	259	31
1988	17.1	22	506	249	24
1986	21.5	20	322	264	32
1984	18.3	23	429	249	21
1982	16.1	16	549	254	22
1980	17.0	14	352	264	29
1978	13.0	19	470	262	27
1977 ¹	15.4	20	229	241	19
1976	7.1	21	238	259	22
1975	5.7	13	233	239	12
1974	5.5	10	--	--	--
1973 ¹	4.4	18	--	--	--

¹Extremely low flows

Table 6. Percent of cutthroat trout over 305 mm (12 inches) counted in snorkel transects (1 snorkeler) in the Selway River (unroaded portion) from White Cap Creek to Race Creek, 1973-1994.

Stream section	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990	1992	1994
White Cap Cr. to Running Cr.	9.5	16.7	11.8	22.2	22.6	16.2	13.2	8.9	15.9	21.3	24.5	29.6	6.7	6.7
Running Cr. to Bear Cr.	11.1	8.3	18.2	16.2	21.5	20.8	11.8	10.7	20.7	14.6	22.4	15.9	25.5	11.1
Bear Cr. to Moose Cr.	34.4	15.5	8.0	25.0	25.0	21.4	9.9	15.0	22.7	18.7	22.9	16.2	48.4	12.1
<u>Weighted means:</u>														
White Cap Cr. to Moose Cr.	18.9	12.7	13.0	20.6	21.8	22.3	11.5	12.0	20.6	17.8	23.2	15.6	32.9	10.8
Moose Cr. to Halfway Cr.	8.3	--	3.6	17.5	12.5	13.6	18.6	17.9	22.1	22.7	21.6	9.5	9.1	--
Halfway Cr. to Three Links Cr.	19.0	16.2	19.0	26.3	17.5	15.9	17.2	23.8	26.1	22.7	26.7	33.0	6.7	0
Three Links Cr. to Jim's Cr.	23.3	5.8	12.5	38.5	27.5	25.0	17.3	22.3	28.4	24.0	23.7	16.3	11.1	0
Jim's Cr. to Race Cr.	--	10.0	50.0	1.8	26.5	35.7	4.1	11.1	30.4	15.5	13.6	46.7	50.0	--
<u>Weighted means:</u>														
Moose Cr. to Race Cr.	17.3	8.0	13.0	21.3	18.9	19.4	17.6	19.9	29.7	21.9	21.0	19.6	18.2	0

Table 7. Average number of cutthroat trout counted/snorkel transect (1 snorkeler) in the Selway River (unroaded portion) from White Cap Creek to Race Creek, 1973-1994.

Stream section	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990	1992	1994
White Cap Cr. to Running Cr.	4.2	3.4	6.8	7.2	10.8	7.4	13.2	11.2	11.0	15.2	13.3	6.8	4.8	7.5
Running Cr. to Bear Cr.	7.2	4.8	6.6	6.2	18.6	10.6	18.6	11.2	17.4	19.2	11.6	16.4	9.4	9.0
Bear Cr. to Moose Cr.	5.3	7.5	5.0	6.0	17.4	19.6	16.0	16.2	19.4	21.4	21.8	7.4	6.2	8.3
<u>Weighted means:</u>														
White Cap Cr. to Moose Cr.	5.6	5.2	6.1	6.5	15.4	12.5	16.2	12.8	16.3	18.8	15.7	10.4	6.9	8.3
Moose Cr. to Halfway Cr.	6.0	9.0	5.6	8.0	24.0	19.7	14.3	19.5	28.3	21.7	18.5	10.5	3.7	--
Halfway Cr. to Three Links Cr.	3.0	7.4	7.0	9.5	20.0	22.0	29.0	21.0	23.0	32.5	30.0	3.0	5.0	3.0
Three Links Cr. to Jim's Cr.	5.0	4.3	8.0	6.5	11.0	16.0	22.0	23.5	18.5	34.7	20.0	12.3	3.0	6.0
Jim's Cr. to Race Cr.	--	2.5	1.2	5.7	7.5	3.5	12.3	18.0	14.0	14.5	14.8	11.0	3.0	--
<u>Weighted means:</u>														
Moose Cr. to Race Cr.	3.6	5.9	5.3	7.4	15.3	13.8	18.0	21.1	20.5	24.3	18.7	9.9	3.7	4.5

Table 8. Average number of juvenile steelhead counted/snorkel transect (1 snorkeler) in the Selway River (unroaded portion) from White Cap Creek to Race Creek, 1973-1994.

Stream section	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990	1992	1994
White Cap Cr. to Running Cr.	1.2	1.1	5.0	4.0	0.8	3.6	5.0	7.4	10.5	5.5	3.8	4.0	3.7	3.8
Running Cr. to Bear Cr.	3.2	7.0	2.2	2.0	0.8	3.4	6.0	14.4	3.8	4.4	4.0	2.2	2.4	1.8
Bear Cr. to Moose Cr.	4.3	3.7	11.0	13.0	3.3	3.4	9.0	19.8	17.2	11.8	18.2	15.6	7.6	10.0
<u>Weighted means:</u> White Cap Cr. to Moose Cr.	2.7	2.6	7.7	5.7	1.9	2.6	5.9	11.1	14.3	7.1	9.1	8.4	4.7	5.2
Moose Cr. to Halfway Cr.	27.5	17.8	17.8	13.2	5.3	22.0	9.7	40.3	43.8	23.7	22.5	34.3	1.7	--
Halfway Cr. to Three Links Cr.	14.0	17.4	25.3	19.5	9.5	12.0	19.0	28.0	31.0	21.0	35.0	42.0	9.3	3.0
Three Links Cr. to Jim's Cr.	19.3	8.8	32.5	23.5	24.7	18.7	18.9	24.2	26.7	28.7	31.8	41.0	2.3	26.0
Jim's Cr. to Race Cr.	6.2	6.7	4.3	10.5	5.8	9.8	10.0	13.0	15.0	12.3	3.3	1.8	0.7	--
<u>Weighted means:</u> Moose Cr. to Race Cr.	12.8	19.2	13.8	12.0	14.9	13.5	29.6	28.1	21.6	23.2	22.5	15.8	3.5	14.5

Table 9. Average number of whitefish counted/snorkel transect (1 snorkeler) in the Selway River (unroaded portion) from White Cap Creek to Race Creek, 1973-1994.

Stream section	1973	1974	1975	1976	1977	1978	1980	1982	1984	1986	1988	1990	1992	1994
White Cap Cr. to Running Cr.	35.2	31.1	8.4	17.8	32.8	9.4	15.8	18.8	23.2	22.2	17.3	22.8	15.0	20.5
Running Cr. to Bear Cr.	39.2	36.4	15.0	6.5	77.8	17.4	17.6	21.2	37.4	30.6	24.2	36.8	45.4	55.5
Bear Cr. to Moose Cr.	31.1	34.2	11.8	9.0	51.3	16.6	19.0	30.2	44.2	31.6	29.6	10.2	13.8	20.0
<u>Weighted means:</u> White Cap Cr. to Moose Cr.	34.9	33.9	11.7	10.9	44.9	12.1	17.6	23.4	35.8	28.6	24.1	21.7	25.4	32.0
Moose Cr. to Halfway Cr.	48.8	31.5	32.4	16.6	69.5	40.3	32.0	43.8	46.2	41.0	44.7	47.3	12.0	--
Halfway Cr. to Three Links Cr.	17.7	31.4	27.0	16.0	65.0	67.0	27.0	47.0	60.0	38.5	70.0	12.0	10.0	19.0
Three Links Cr. to Jim's Cr.	23.8	19.0	41.0	19.5	49.7	46.0	38.3	59.0	50.0	50.7	35.0	27.3	9.0	5.0
Jim's Cr. to Race Cr.	5.2	16.8	18.7	2.0	41.0	20.5	20.0	21.0	32.5	19.7	22.3	8.8	9.0	--
<u>Weighted means:</u> Moose Cr. to Race Cr.	23.0	21.5	29.3	13.3	50.4	39.6	28.8	47.9	44.2	35.9	36.8	26.5	13.1	12.0

Table 10. Summary of fish densities (per 100 m²) as determined by snorkeling in the Lochsa River drainage, 1994.

Stream	Date	Total	Steelhead trout				Cutthroat trout			Chinook salmon	Mountain whitefish	Bull trout
			Age 0	Age 1	Age 2	Age >2	Total	<305 mm	>305 mm			
Fire Creek, lower	8/9	14.92	4.30	7.59	3.03	0	0	0	0	0	0	0
Fire Creek, upper	8/9	31.73	2.72	12.69	12.69	3.63	0.91	0.91	0	0.91	0	0
Fish Creek, lower	7/11	25.59	7.45	11.75	5.56	0.83	0.25	0.25	0	0	0	0
Fish Creek, upper	7/11	36.98	11.14	20.64	5.05	0.15	0.30	0.30	0	0	0	0
Lochsa River at Papoose Creek	8/8	0.23	0.19	0.04	0	0	0.34	0.22	0.12	0.28	0	0
Lochsa River at Warm Springs	8/8	0.24	0	0.07	0.14	0.03	0.45	0.31	0.14	0	1.07	0
Lochsa River at Fish Creek	8/8	0.24	0.17	0.07	0	0	0	0	0	0	0.58	0
Lochsa River at Pete King Creek	8/8	0.09	0.04	0	0.01	0.04	0.01	0	0.01	0	0.68	0
Old Man Creek	8/9	17.38	9.13	6.85	0.81	0.40	1.01	0.81	0.20	0.50	2.32	0
Split Creek, lower	8/9	24.37	19.63	4.40	0.34	0	1.02	1.02	0	0	0	0
Split Creek, upper	8/9	20.11	12.44	3.73	3.73	0.21	0.21	0.21	0	0	0	0
Warm Springs Creek	8/9	2.68	1.69	0.69	0.30	0	2.43	1.59	0.84	1.69	0	0.10
Post Office Creek, lower	8/9	6.72	5.05	1.67	0	0	0	0	0	0	0	0
Post Office Creek, upper	8/9	42.9	24.27	11.03	0.88	0	0.88	0.88	0	0	0	0

Table 11. Chinook salmon redd counts on three tributaries of the upper Lochsa River, 1994.

Drainage	Reach	Type ¹	Description	Date	Method	Redds	----Fish----	
							Live	Dead
Crooked Fork	NC-9	NT	Mouth to Hopeful Creek	9/12	Aerial	7	7	0
	NC-10	T	Rock Creek to Cliff Hole	8/29	Ground	1	1	0
Brushy Fork	NC-11	T	Low Gap Bridge to one mile downstream	9/9	Ground	0	0	0
	NC-12	T	Mouth to Spruce Creek	9/12	Aerial	4	0	1
White Sands	NC-13	NT	Mouth to Big Flat Creek	9/12	Aerial	1	0	0
Lochsa drainage aerial count total						12		

¹NT = non-traditional transect, T = traditional transect

Table 12. Summary of fish densities (per 100 m²) as determined by snorkeling in the Snake River drainage, 1994.

Stream	Date	Total	Steelhead trout				Cutthroat trout			Chinook salmon	Mountain whitefish	Bull trout
			Age 0	Age 1	Age 2	Age >2	Total	<305 mm	>305 mm			
Granite Creek, lower	8/10	37.63	22.22	6.09	6.81	2.51	0	0	0	2.51	0	0
Granite Creek, middle	8/10	19.01	11.52	2.88	4.03	0.58	0	0	0	4.03	0	0
Granite Creek, upper	8/10	12.68	0.56	5.92	4.79	1.41	0.28	0.28	0	0	0	0
Sheep Creek, lower	8/9	51.41	16.58	9.40	11.61	13.82	0	0	0	9.40	0	0
Sheep Creek, upper	8/9	27.52	16.51	4.13	4.13	2.75	0	0	0	3.21	0	0.46

Salmon River

Nine tributaries of the lower Salmon River were surveyed by snorkeling in 1994 (Table 13). Juvenile chinook salmon were found in only two tributaries, Race and West Fork White Bird creeks. Two bull trout were observed in Bargamin Creek. Historic snorkeling information is found in Appendix A.

North Fork Clearwater River

Fisheries management personnel snorkeled 14 streams in this drainage as a continuation of surveys initiated in 1993. Rainbow trout were the most abundant fish observed (Table 14). Bull trout were found only in Orogrande and Skull creeks.

Elk Creek (a tributary of Dworshak Reservoir) was electrofished to determine composition of the brook trout *S. fontinalis* population. Because of problems with the electrofishing equipment, no population estimate was made. One hundred and eighty-five brook trout were sampled, and the length ranged from 50 mm to 460 mm (Figure 1). Age composition for these fish is also given.

Clearwater River

Five tributaries were snorkeled in the drainage. Steelhead/rainbow trout were the most abundant species (Table 15). No bull trout or chinook salmon were observed in any of the ten transects.

In cooperation with the Idaho Division of Environmental Quality, six tributaries in the drainage were electrofished as part of an overall watershed analysis study. Steelhead/rainbow trout and brook trout were the only two game fish species abundant enough to estimate population size (Tables 16 and 17). Length frequency of all steelhead/rainbow trout collected in the drainage is shown in Table 18 and Figure 2.

South Fork Clearwater River

Nine chinook salmon juveniles were observed while snorkeling in eight transects on three streams in the South Fork Clearwater River drainage (Table 19). Those fish were observed in lower Johns Creek on July 22. One bull trout (in Ten Mile Creek) was observed during these surveys in August.

Table 13. Summary of fish densities (per 100 m²) as determined by snorkeling in the Lower Salmon River drainage, 1994.

Stream	Date	Total	Steelhead trout				Cutthroat trout			Chinook salmon	Mountain whitefish	Bull trout
			Age 0	Age 1	Age 2	Age >2	Total	<305 mm	>305 mm			
Crooked Creek, upper	7/12	7.81	4.65	1.49	1.67	0	0	0	0	0	0.93	0
Bargamin Creek, lower	7/10	4.48	0.72	1.79	1.43	0.54	2.15	1.79	0.36	0	1.07	0.18
Bargamin Creek, upper	7/10	3.47	0.19	1.35	1.35	0.58	0.79	0.79	0	0	0.38	0.38
Jersey Creek	7/11	6.89	6.20	0	0.69	0	0.69	0.69	0	0	0	0
John Day Creek, lower	8/11	10.21	0	7.66	2.55	0	0	0	0	5.75	0	0
John Day Creek, upper	8/11	17.42	2.56	8.20	4.10	2.56	0	0	0	0	0	0
Race Creek	8/11	41.11	21.07	17.27	2.42	0.35	0	0	0	2.42	0	0
Sheep Creek, lower	7/13	2.40	0.20	1.00	1.00	0.20	0.20	0.20	0	2.6	1.8	0
Skookumchuck Creek, lower	8/11	42.70	33.92	5.99	2.79	0	0	0	0	0	0	0
Skookumchuck Creek, upper	8/11	20.99	7.67	8.48	4.44	0.40	0	0	0	0	0	0
S.F. White Bird Creek, lower	6/22	10.98	0	9.98	1.00	0	0	0	0	0.50	0	0
S.F. White Bird Creek, upper	6/22	17.40	0.50	13.42	2.98	0.50	0	0	0	0	0	0
White Bird Creek	6/22	7.81	0.56	5.76	1.30	0.19	0	0	0	0	0	0

Table 14. Summary of snorkeling observations (fish/100 m²) in N.F. Clearwater River drainage, 1993-1994.

Stream - Year	Area (m ²)	Age 0	Rainbow trout			Cutthroat trout		Bull trout	Mountain whitefish
			Age 1	Age 2	Age >2	<305 mm	>305 mm		
Beaver Creek #1 1994	165	0.61	3.03	1.82	0.61	0	0	0	0
Beaver Creek #2 1994	324	0	2.47	1.24	0	0	0	0	0
Beaver Dam Creek #1 1994	67	0	1.49	0	0	1.49	0	0	0
Beaver Dam Creek #2 1994	47	0	0	0	0	0	0	0	0
Collin's Creek #1 1994	226	0	2.65	2.65	0	0	0	0	0
Collin's Creek #2 1994	186	0	7.52	2.14	0	0	0	0	0
Collin's Creek #3 1994	156	0	7.70	1.93	0	0	0	0	0
French Creek #1 1994	171	0	0.58	0	0	0	0	0	0
French Creek #2 1994	79	0	0	3.78	0	0	0	0	0
French Creek #3 1994	90	0	0	3.34	0	0	0	0	0
Hemlock Creek #1 1994	145	0	3.46	1.38	0	0	0	0	0
Hemlock Creek #2 1994	60	0	1.67	1.67	0	0	0	0	0
Hemlock Creek #3 1994	141	0	8.53	2.13	0.71	0	0.71	0	0

Table 14. Continued.

Stream - Year	Area (m ²)	Age 0	Rainbow trout			Cutthroat trout		Bull trout	Mountain whitefish
			Age 1	Age 2	Age >2	<305 mm	>305 mm		
Hemlock Creek L									
1993	107	0	8.39	4.66	0	0.93	0.93	0	1.86
1994	48	0	8.29	20.7	2.07	0	0	0	0
Hemlock Creek #4									
1993	331	0.60	1.81	0.91	0.31	0	0	0	0
1994	156	0	5.75	2.56	1.91	2.56	0.64	0	0
Isabella Creek #1									
1994	109	0	11.91	5.50	0	0	0	0	0
Isabella Creek #2									
1994	100	1.00	7.02	4.01	0	0	0	0	0
Isabella Creek #3									
1994	40	0	12.64	0	0	0	0	0	0
Isabella Creek #4									
1994	99	0	6.06	3.03	1.01	0	2.02	0	0
Little Moose Creek #1									
1994	181	0	2.21	3.32	0.55	0	0	0	0
Little Moose Creek #2									
1994	191	0	2.09	2.62	0	0	0	0	0
Little Moose Creek #3									
1994	122	0	2.47	4.12	0	0	0.82	0	0
Little Weitas Creek - L									
1993	180	3.34	3.34	0	0	0.56	0	0	0
1994	152	5.26	1.31	0	0	0.66	0	0	0
Little Weitas Creek - U									
1993	205	0.49	5.37	0	1.47	1.47	0	0	0
1994	173	4.62	1.15	1.73	0	0	0	0	0

Table 14. Continued.

Stream - Year	Area (m ²)	Age 0	Rainbow trout			Cutthroat trout		Bull trout	Mountain whitefish
			Age 1	Age 2	Age >2	<305 mm	>305 mm		
Middle Creek #1 1994	169	0	12.99	5.90	0	3.54	0	0	0
Middle Creek #2 1994	123	0	4.88	0.81	0	0	0	0	0
Middle Creek #3 1994	70	1.42	5.70	2.85	0	0	0	0	0
Middle Creek - L 1993	58	0	5.19	0	0	1.73	0	0	0
1994	83	0	0	0	0	0	0	0	0
Middle Creek - U 1994	78	2.56	2.56	0	0	0	0	0	0
Orogrande Creek #1 1994	111	0	0	0	0	0	0	0.90	0
Orogrande Creek #2 1994	162	0	3.09	0	0	0	0	0.62	0.62
Orogrande Creek #3 1994	184	0	0.54	0	0	0	0	0	0
Quartz Creek #1 1994	142	1.41	2.11	0	0	0	0	0	0
Quartz Creek #2 1994	144	0.70	6.27	1.39	0	0	0	0	0
Ruby Creek 1994	74	1.36	1.36	0	0	0	0	0	0
Skull Creek #1 1994	277	0.36	5.78	2.88	0	0	0.36	0	0

Table 14. Continued.

Stream - Year	Area (m ²)	Age 0	Rainbow trout			Cutthroat trout		Bull trout	Mountain whitefish
			Age 1	Age 2	Age >2	<305 mm	>305 mm		
Skull Creek #2									
1994	346	1.16	2.60	2.30	0	0	0	0	0
Skull Creek #3									
1994	426	0.94	3.05	2.82	0	0.70	0.94	0.70	3.52
Skull Creek #4									
1994	576	0.35	0.69	1.91	0.35	0	1.04	0	1.56
Weitas - lower									
1993	1,380	0	0.07	0	0	0.07	0	0	0.02
1994	1,734	0	0.23	0.12	0.06	0	0	0	0.06
Weitas - upper									
1993	634	0	1.26	0.16	0.95	0.47	0	0	9.77
1994	4423	0	0	0	0	0	5.42	0	12.18

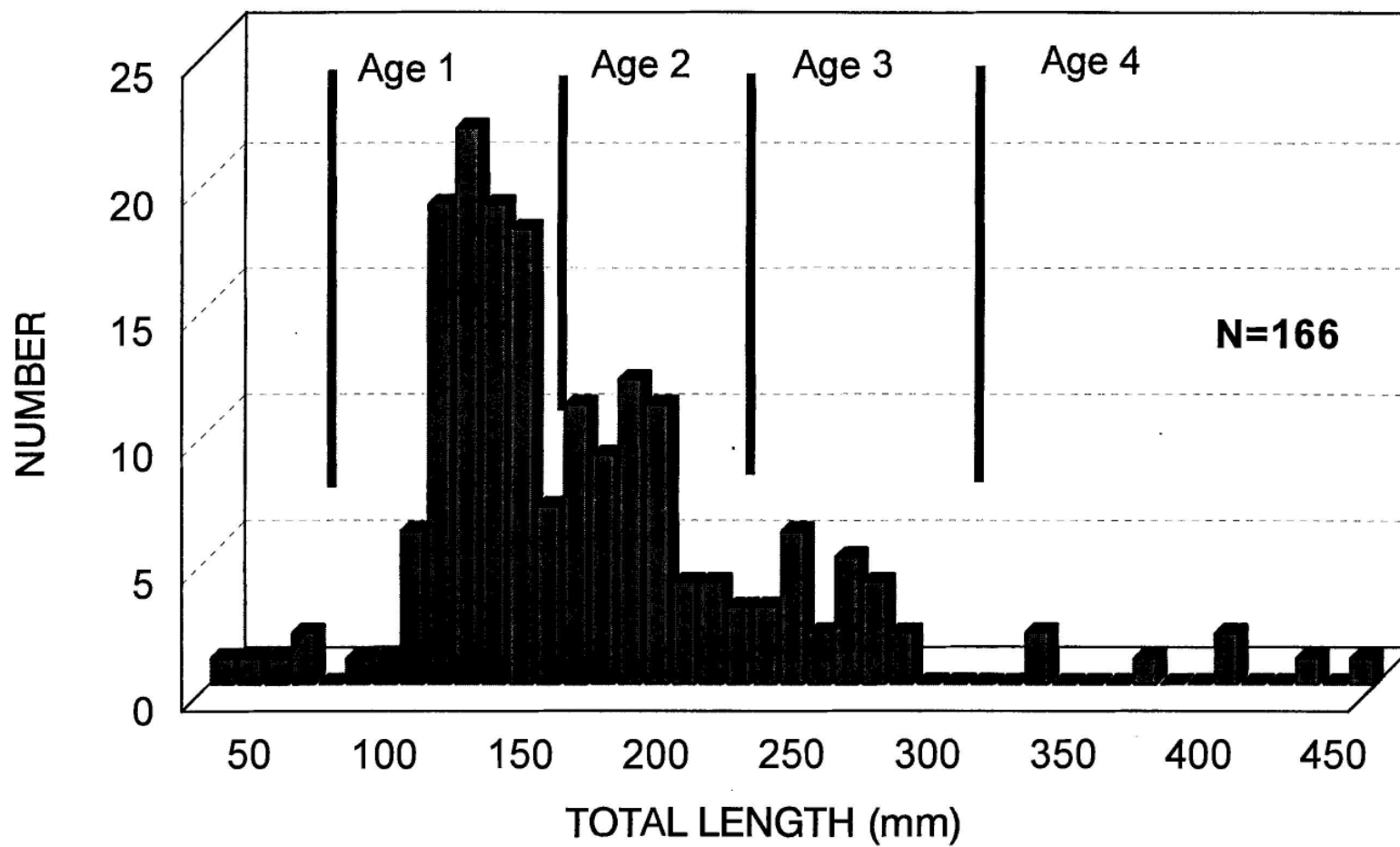


Figure 1. Length frequency of brook trout collected by electrofishing in Elk Creek (tributary of Dworshak Reservoir), Idaho, 1994.

Table 15. Summary of fish densities (per 100 m²) as determined by snorkeling in the Lower Clearwater River drainage, 1994.

Stream	Date	Total	Steelhead trout				Cutthroat trout			Smallmouth bass	Mountain whitefish	Brook trout
			Age 0	Age 1	Age 2	Age >2	Total	<305 mm	>305 mm			
Bedrock Creek	6/20	22.93	20.23	1.35	1.35	0	0	0	0	0	0	0
Big Canyon Creek D P	6/20	18.14	17.44	0.35	0.35	0	0	0	0	0	0.35	0
Big Canyon Creek, bridge	6/20	4.28	3.21	0.64	0.43	0	0	0	0	0	0	0
E.F. Potlatch River, lower	6/21	3.12	1.56	1.04	0.52	0	0	0	0	0	0	0
E.F. Potlatch Creek, middle	6/21	0	0	0	0	0	0.43	0.43	0	0	0	0
E.F. Potlatch Creek, upper	6/21	0.27	8.34	0.93	0	0	0	0	0	0	0	25.96
Potlatch River, lower	6/21	0.32	0.32	0	0	0	0	0	0	0.11	0	0
Potlatch River, upper	6/21	3.66	1.74	1.40	0.52	0	0	0	0	0	0	0
Mission Creek, lower	6/20	5.82	5.25	1.57	0	0	1.57	1.57	0	0	0	0
Mission Creek, upper	6/20	6.00	3.82	2.18	0	0	1.64	1.64	0	0	0	0

Table 16. Population estimate of area sampled for rainbow trout by electrofishing in the Potlatch River drainage, 1994.

Water	Number of fish sampled	Area sampled (m ²)	Population estimate ± confidence interval (95%)	Fish per 100 m ²
Big Bear (lower)	27	104	29 ± 6	2.8
Big Bear (upper)	12	341	14 ± 5	4.1
Little Bear (lower)	52	323	53 ± 3	16.4
Pine (lower)	12	538	14 ± 5	2.6
Cedar (lower)	61	644	65 ± 7	10.1
Cedar (upper)	78	165	80 ± 156	48.5
Ruby (lower)	47	327	49 ± 3	15.0
W. Fk. Potlatch (upper)	2	182	2 ± 0	1.1

Table 17. Population estimate of area sampled for brook trout by electrofishing in the Potlatch River drainage, 1994.

Water	Number of fish sampled	Area sampled (m ²)	Population estimate ± confidence interval (95%)	Fish per 100 m ²
Boulder (lower)	79	282	85 ± 9	30.1
Ruby (lower)	5	333	5 ± 0	1.5
Ruby (upper)	14	125	14 ± 1	11.2
W.Fk. Potlatch (upper)	5	1,500	9 ± 26	0.6

Table 18. Length frequency of rainbow trout electrofished by stream in the Potlatch River drainage, 1994.

Length (mm)	Lower Little Bear	Lower Big Bear	Upper Big Bear	Lower Pine	Lower Cedar	Upper Cedar	Upper W.Fk. Potlatch	Lower E.Fk. Potlatch	Middle E. Fk. Potlatch	Upper E. Fk. Potlatch	Lower Ruby	E. Fork Big Bear
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	5	0
50	0	0	0	0	1	0	0	0	13	2	27	0
60	2	0	0	0	20	0	0	1	2	2	6	2
70	9	6	1	1	36	5	0	0	0	1	0	1
80	2	0	0	0	1	18	0	0	0	11	0	7
90	0	0	0	0	0	11	0	0	5	21	1	4
100	0	0	0	0	0	10	0	0	7	7	3	1
110	0	0	0	0	0	13	0	0	5	4	8	1
120	1	0	2	2	0	11	2	0	4	0	0	0
130	3	2	2	2	0	5	0	1	1	0	3	1
140	4	2	3	3	0	3	0	2	2	0	1	0
150	5	9	0	0	0	0	0	0	1	2	0	0
160	12	3	1	1	0	0	0	1	1	0	0	2
170	8	2	1	1	0	0	0	0	1	0	0	0
180	6	3	0	0	0	0	0	0	0	0	0	0
190	1	0	2	2	0	1	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0
210	0	0	0	0	0	1	0	0	0	0	0	0
Total numbers	53	27	12	12	58	78	2	5	42	50	54	19

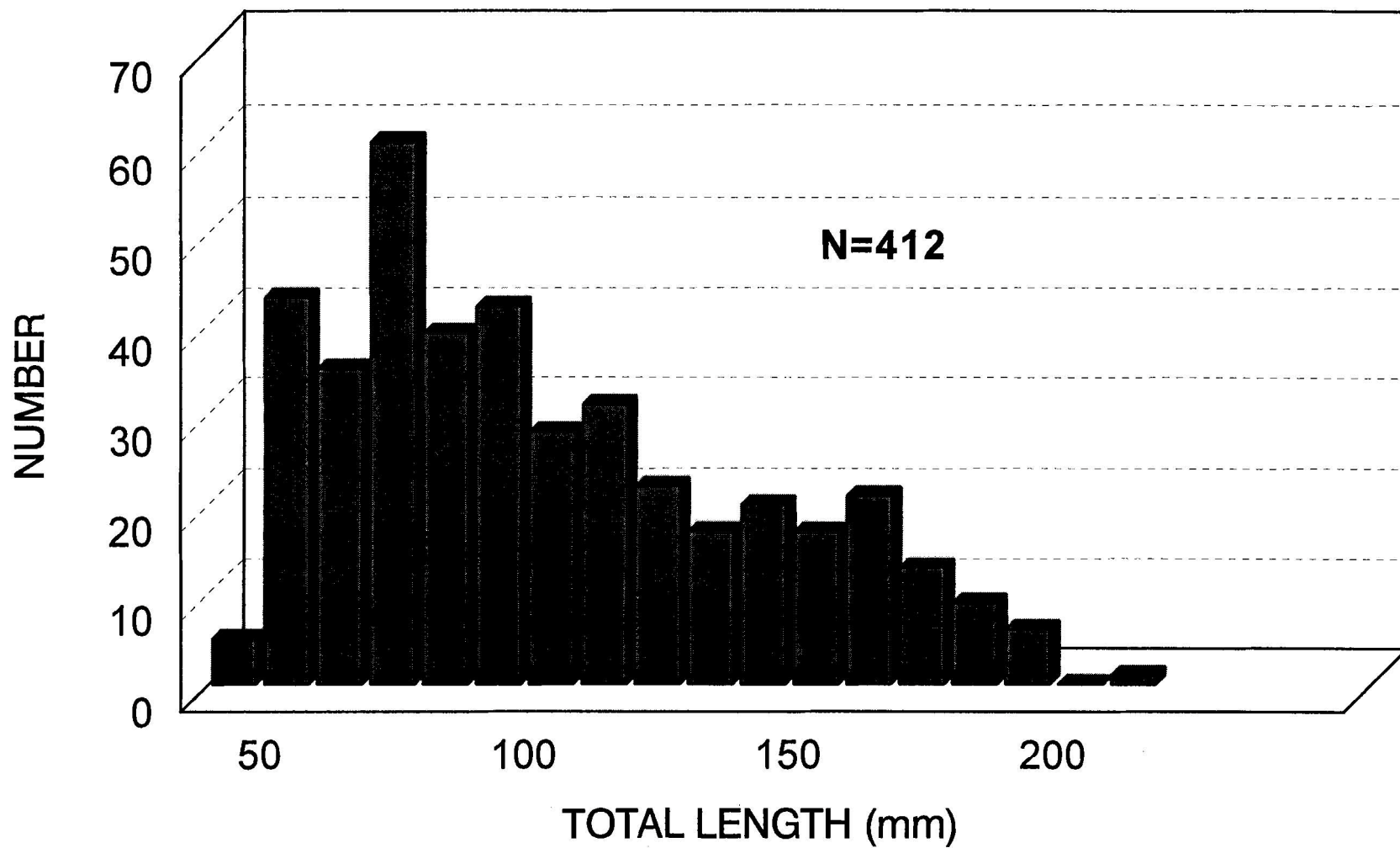


Figure 2. Length frequency of steelhead/rainbow trout collected by electrofishing in eight streams in the Potlatch River drainage, Idaho, 1994.

Table 19. Summary of fish densities (per 100 m²) as determined by snorkeling in the South Fork Clearwater River drainage, 1994.

Stream	Date	Total	Steelhead trout				Cutthroat trout			Chinook salmon	Mountain whitefish	Bull trout
			Age 0	Age 1	Age 2	Age >2	Total	<305 mm	>305 mm			
Johns Creek, lower #1	7/22	5.78	3.47	0.23	2.08	0	0	0	0	0	0.23	0
Johns Creek, lower #2	7/22	11.77	3.27	2.94	5.23	0.33	0	0	0	2.94	0	0
Johns Creek, upper #3	8/29	2.00	0	1.00	1.00	0	0.25	0.25	0	0	0	0
Johns Creek, upper #4	8/29	1.49	0	0.30	1.19	0	0.59	0.59	0	0	0	0
Moore Creek, lower	8/29	0	0	0	0	0	0	0	0	0	0	0
Moore Creek, upper	8/29	0	0	0	0	0	0.38	0.38	0	0	0	0
Ten Mile Creek, lower	8/2	4.32	1.78	1.27	1.27	0	0	0	0	0	0	0.51
Ten Mile Creek, upper	8/2	5.67	2.18	3.05	0.44	0	0.22	0.22	0	0	0.22	0

In cooperation with the Nez Perce National Forest, an intensive bull trout survey was done in the Newsome Creek drainage of the South Fork Clearwater River. The summary report for the 1994 study is presented in Appendix B.

SMALLMOUTH BASS

Methods

We sampled smallmouth bass *Micropterus dolomieu* in the Snake and Salmon rivers using pulsed D.C. current from a portable generator and a Coffelt VVP-2E pulsator. Booms and electrodes were mounted on a 5.5-m aluminum boat. Sampling took place during daylight hours to avoid safety hazards. Smallmouth bass were also captured using angling techniques. Length frequencies were constructed.

We duplicated 1991 through 1993 electrofishing efforts in an area temporarily dewatered during the 1992 drawdown test in Lower Granite Reservoir. We used the same techniques each year. The sampling area was on the Idaho shore of the slackwater reach between U.S. Highway 12 bridge and the Lewiston Grain Growers elevators at Lewiston, Idaho.

Results

Snake River

Two sections of the Snake River were electrofished, one between the Interstate and Southway bridges and the other above Pittsburg Landing. Data for smallmouth bass collected in the lower transect is used to compare with previous years' information from the same section (Figure 3). The 74 smallmouth bass collected in 1994 was the least number sampled to date.

Smallmouth bass collected above Pittsburg Landing by electrofishing and angling in June 1994 are recorded in Figure 4. Most of these fish were over 200 mm total length.

Salmon River

Smallmouth bass were collected by angling and electrofishing in the lower Salmon River in August and September, 1994. Two hundred fifty fish were collected and measured (Figure 5). Most of these fish were over 240 mm total length.

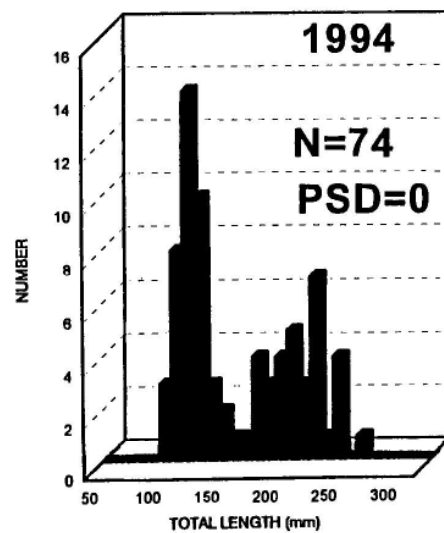
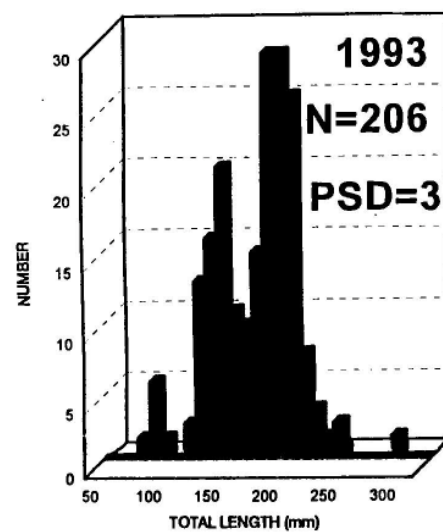
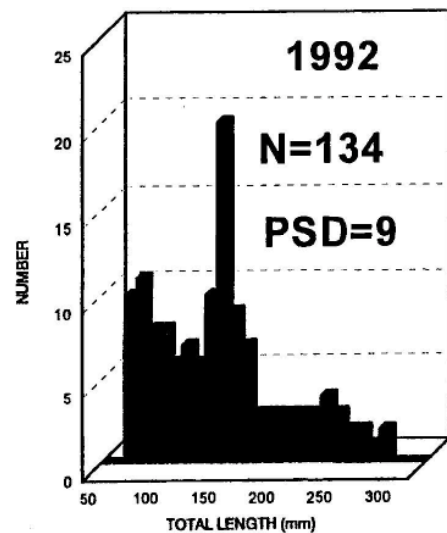
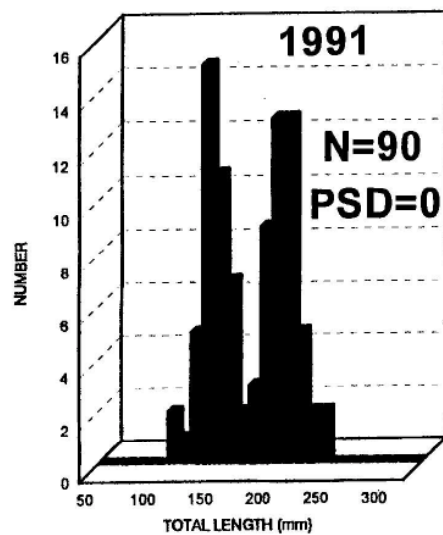


Figure 3. Data collected for smallmouth bass from the lower transect comparing 1994 with previous years' information from the same section.

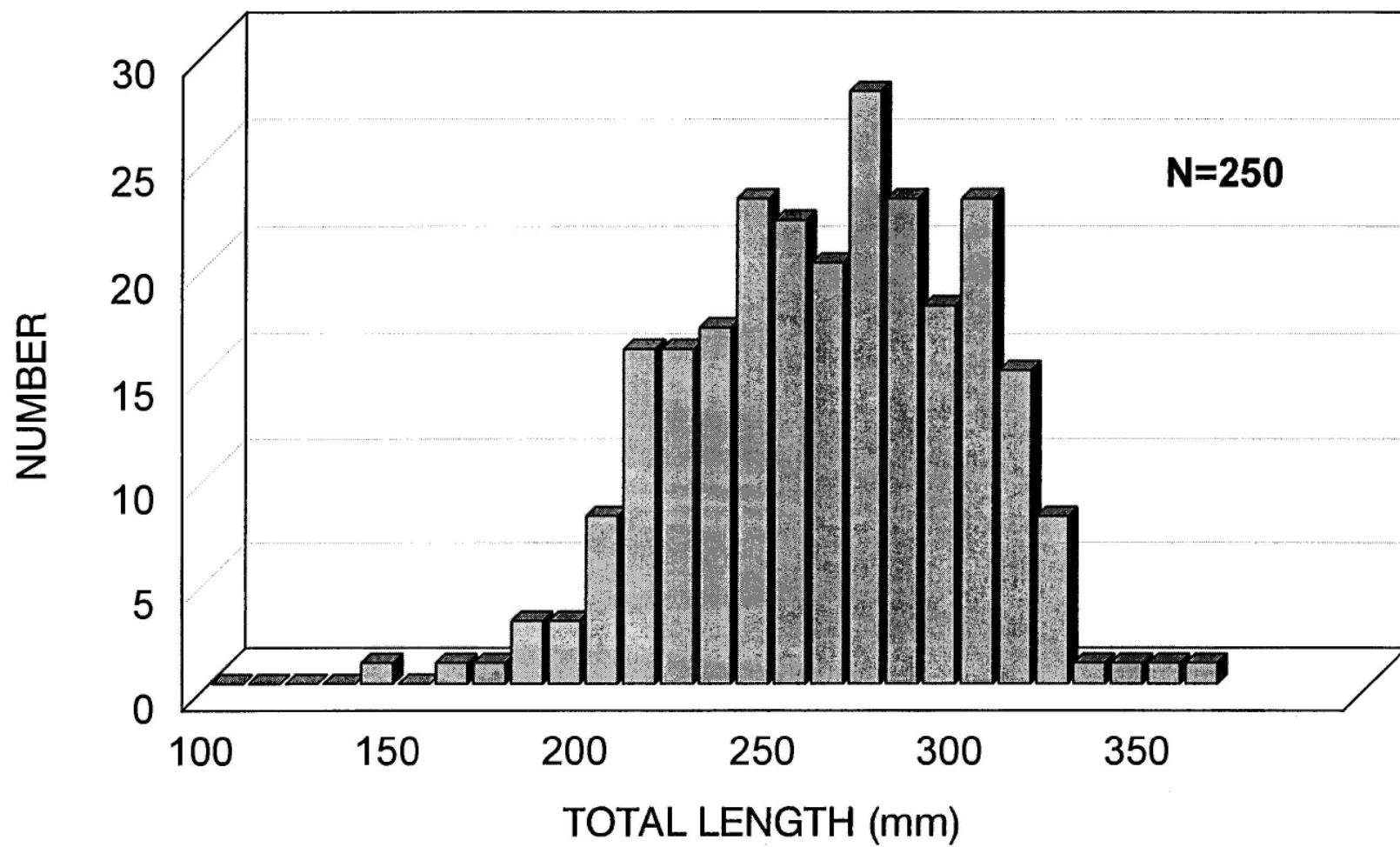


Figure 4. Length frequency of smallmouth bass collected by electrofishing in the Hells Canyon section of the Snake River, Idaho, 1994.

salbass

salbass

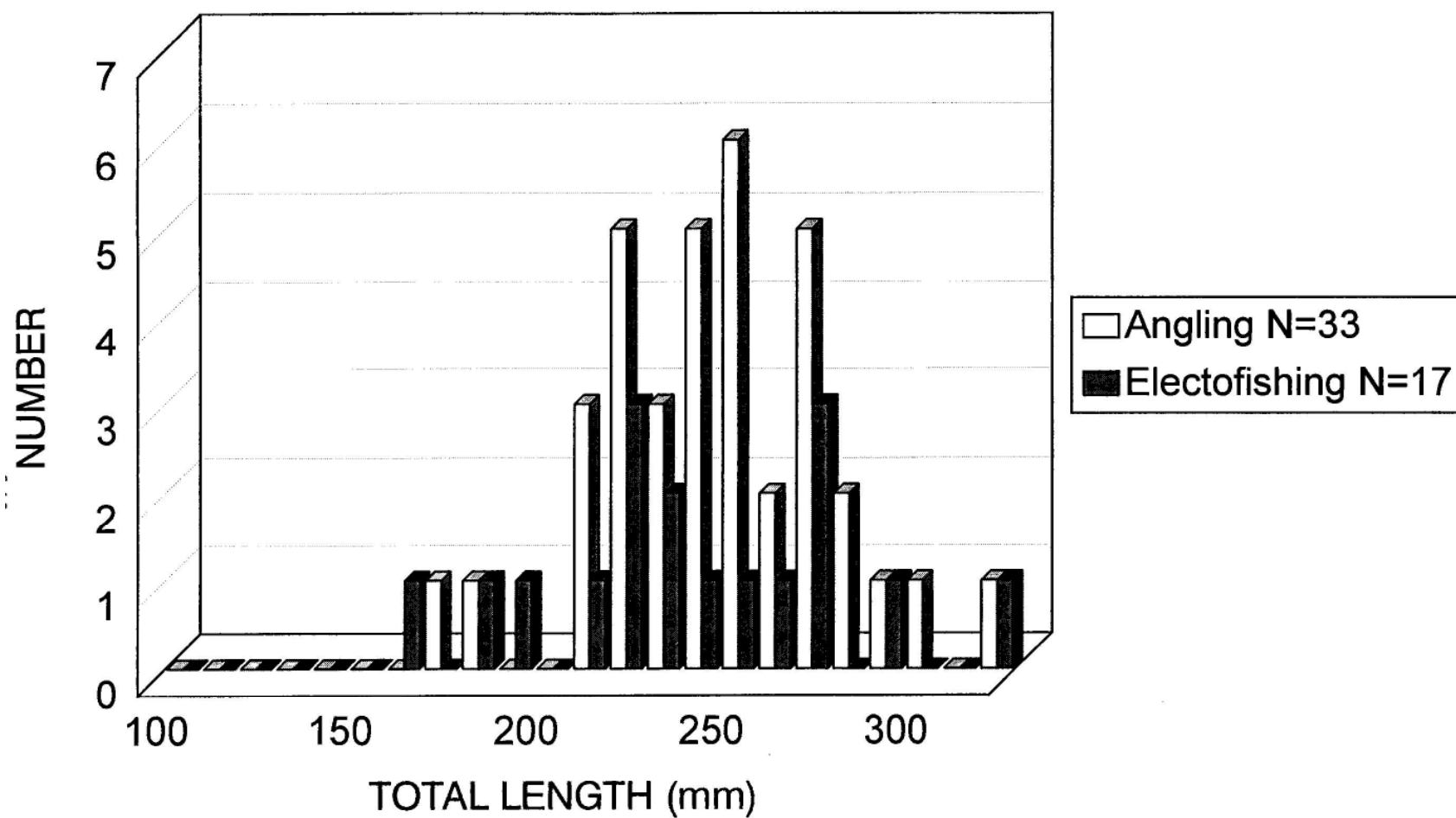


Figure 5. Length frequency of smallmouth bass collected by electrofishing and angling in the Salmon River below White Bird, Idaho, 1994.

hcbass

hcbass

WHITE STURGEON

Methods

We sampled white sturgeon with traditional hook and line methods in the Snake and Salmon rivers. Passive Integrated Transponder (PIT) tags were inserted in the left side of the fish, just below the base of the dorsal fin. Sturgeon were inspected for previous marks, tags, and hook scars.

Results

Snake River

During the 1994 field season, fishery management personnel and volunteers captured and PIT tagged 105 white sturgeon on the Snake River between Lewiston and Hells Canyon Dam (Figure 6). In addition, another 25 white sturgeon were captured which had previously been PIT tagged (Table 20). Over the past several years, over 1,800 (Appendix C) white sturgeon have been PIT tagged in the Snake River above Lower Granite Dam, most of which by a University of Idaho research team.

Salmon River

Two white sturgeon were captured in the lower river below White Bird, and these fish were PIT tagged (Table 21).

SALMONID SAMPLING AND DIET ANALYSIS

Methods

As in 1992 and 1993, we sampled residualized hatchery steelhead trout smolts and wild rainbow trout in the Snake, Salmon, and Clearwater rivers using pulsed D.C. current from a portable generator and a Coffelt VVP-2E pulsator. Booms and electrodes were mounted on a 5.5-m aluminum boat. Steelhead smolts were also collected using traditional hook and line methods.

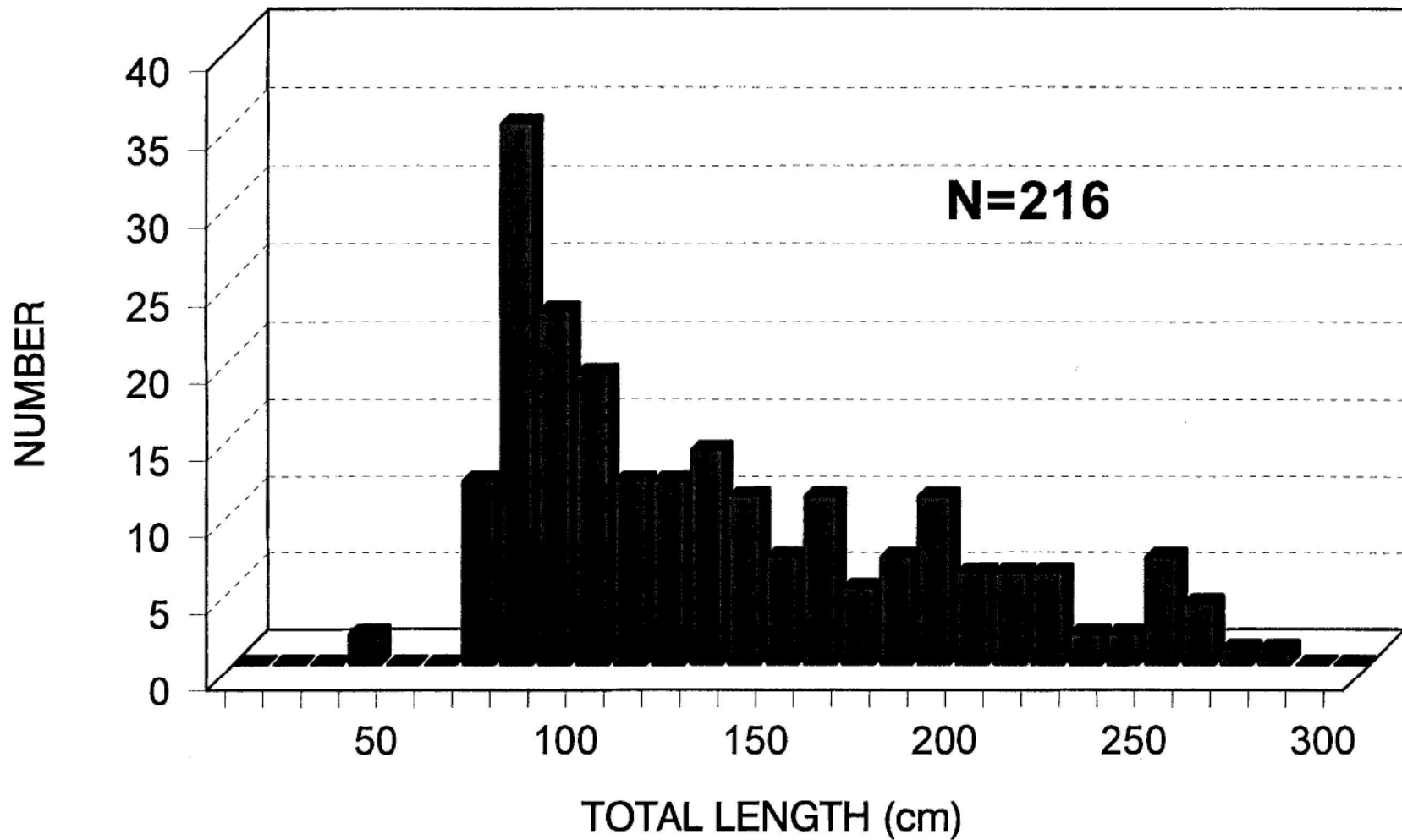


Figure 6. Total length of white sturgeon captured and P.I.T. tagged in the Snake River between Hells Canyon Dam and Lewiston, Idaho, 1991-94.

Table 20. Recaptures of white sturgeon with Passive Integrated Transponder (PIT) tags in the Snake River below Hells Canyon Dam, 1994.

PIT tag number	Date	Total length (cm)	Length increase (cm)	River Km captured	Km moved	Days at large
7F7D0B7272	4/17	103	6	286	0	289
7F7D0D7247	5/14	97	0	285	49	16
7F7D0D7C28	5/14	132	1	285	49	14
7F7D0F7055	6/2	147	2	338	0	39
7F7D0D776C	6/2	127	8	339	1	661
7F7D0D6706	6/7	81	2	296	8	324
7F7D0D657E	6/7	170	8	310	2	302
7F7D016018	6/11	161	--	295	--	1,146
7F7D0E3239	6/28	92	--	322	--	--
7F7D0D651F	6/28	137	0	336	2	46
7F7D0D7E36	6/29	160	1	332	0	67
7F7F427512	6/29	127	10	332	1	767
7F7D0D6147	6/29	--	--	322	--	--
7F7D0D7A78	6/29	94	0	295	0	39
7F7F403141	6/29	208	0	295	5	673
7F7D0D7B04	7/19	124	0	294	0	93
7F7403C0E	7/19	189	7	306	1	695
7F7D0D624A	7/19	145	0	305	0	25
7F7D0D622E	8/22	110	0	336	2	100
7F7D0D780F	9/18	126	2	336	0	127
7F7D0D622E	9/24	110	0	334	2	160
7F7D0F2E0B	9/25	235	--	305	--	--
7F7D0C0014	9/25	93	0	299	0	22
7F7D043D77	10/9	183	5	343	0	103
7F7D0D776C	10/9	140	13	343	0	790
7F7D0D5F2F	10/9	107	2	339	1	103

Table 21. List of white sturgeon captured and tagged with PIT tags in the Salmon River, Idaho, 1994.

PIT tag number	Date	Rkm	Total length (cm)	Fork length (cm)
7F7D0B4734	8/14/94	51	206	178
7F7D042B28	8/20/94	56	180	160

All trout were measured for length. Residualized hatchery steelhead trout smolts were sacrificed and their stomachs dissected for diet analysis. Wild rainbow trout were released unharmed. Hatchery steelhead trout juveniles were identified by a missing adipose fin.

Results

Snake River

We sampled the Snake River from Hells Canyon Dam to the Salmon River on June 1, 2, 13, 14, and 15. We collected 53 residualized hatchery steelhead smolts. Total length of fish sampled ranged from 210 to 480 mm (Figure 7).

We examined the stomachs of all 53 fish by dissection. Diet consisted almost exclusively of aquatic insects (adult caddis flies). Some terrestrial insects, green algae, and aquatic snails were also found. No fish were found in the stomach of any rainbow trout.

Salmon River

The Salmon River below Twin Bridges (rkm 99.2) was sampled on August 8, 9, 10, 23, 24, and 25. One hundred eight rainbow trout and steelhead trout smolts were captured. All but three fish in the sample resulted from hatchery stocking. Total length of fish collected ranged from 220 to 460 mm (Table 22). Trout originating from the regional hatchery fingerling program accounted for 57.4% of the sample.

All 105 stomachs from hatchery origin fish were examined by dissection. Diet consisted of aquatic and terrestrial insects and green algae. One 290 mm residualized steelhead trout had an unidentified fish in its stomach.

Clearwater River

The Clearwater River below Orofino (rkm 65) was sampled by electrofishing on June 28, August 22, and August 30. Thirty-nine residualized steelhead trout, three hatchery origin fingerling trout and nine wild/natural rainbow trout were collected. Total length of fish sampled ranged from 170 mm to 430 mm (Table 23).

All 42 stomachs from hatchery fish were examined by dissection. Diet consisted of aquatic and terrestrial insects and green algae. No fish were found in the stomachs of any fish sampled.

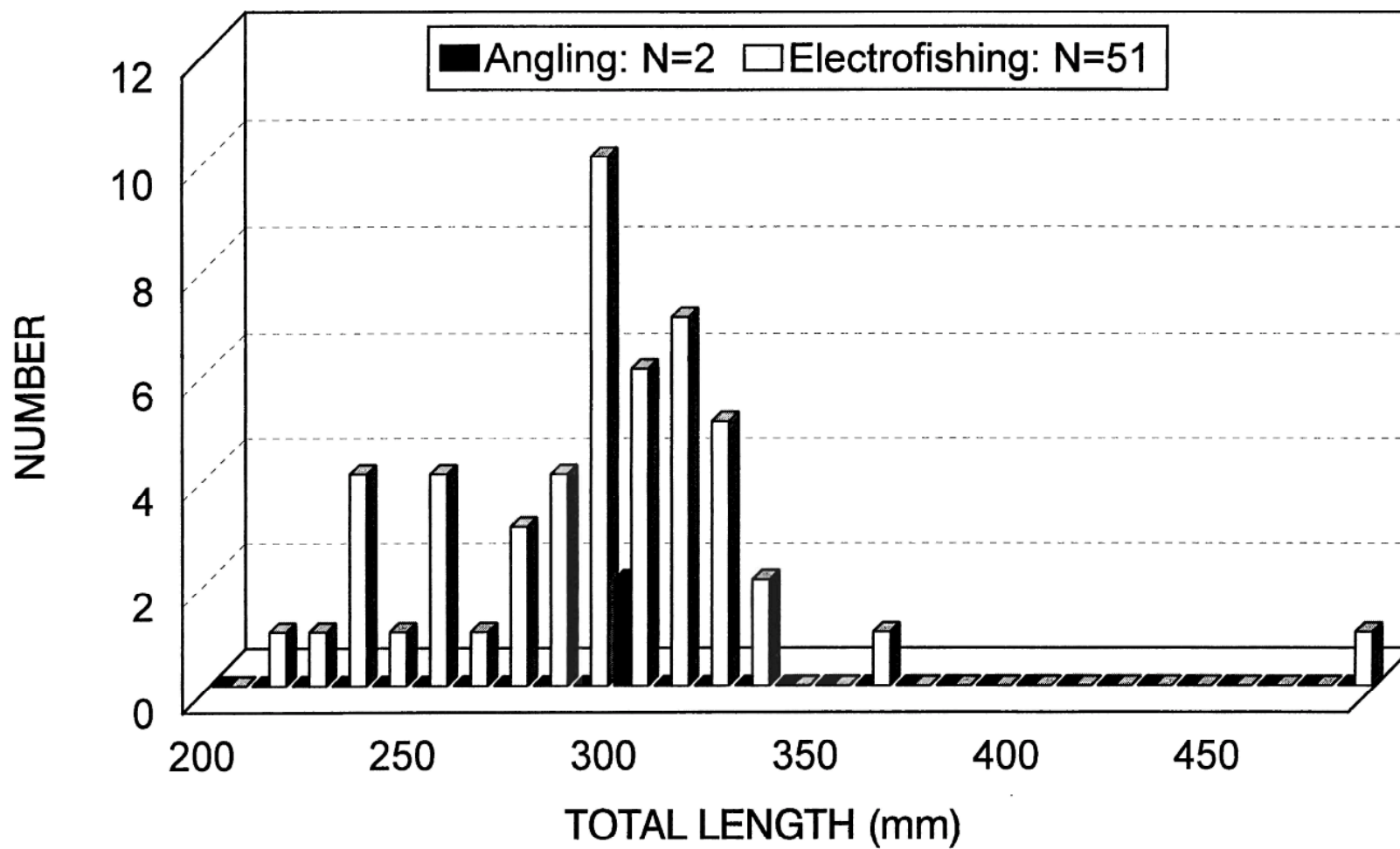


Figure 7. Length frequency of steelhead/rainbow trout collected in the Hells Canyon section of the Snake River, Idaho, 1994.

Table 22. Length frequency of trout collected in the Salmon River from river kilometer 99.2 to the mouth, 1994. Fish are listed by type and collection method. Rod and reel (r&r) and electrofishing (efish) were used.

Length (mm)	Residualized steelhead <u>adipose clip</u>		Domestic kamloop <u>LV clip</u>		Spokane rainbow <u>RV clip</u>		Hatchery rainbow <u>(no mark)</u>		Natural rainbow		Total
	r&r	efish	r&r	efish	r&r	efish	r&r	efish	r&r	efish	
200	0	0	0	0	0	0	0	0	0	0	0
210	0	0	0	0	0	0	0	0	0	0	0
220	0	0	0	0	1	0	0	0	0	0	1
230	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	1	0	0	0	0	0	1
250	2	0	2	3	1	1	0	0	0	0	9
260	2	0	2	2	1	1	0	0	0	0	8
270	3	0	3	0	4	0	1	0	1	0	12
280	6	0	5	2	2	0	2	1	0	0	18
290	7	0	7	0	1	2	0	0	0	0	17
300	8	0	5	2	1	0	0	0	0	0	16
310	3	1	3	0	0	0	0	1	0	0	8
320	4	0	1	0	0	0	1	0	0	0	6
330	2	0	1	0	0	0	0	0	0	0	3
340	0	0	1	0	0	0	0	0	0	0	1
350	4	0	0	0	0	0	0	0	0	0	4
360	0	0	0	0	0	0	0	0	1	0	1
370	1	0	0	0	0	0	0	0	0	0	1
380	0	0	0	0	0	0	0	0	1	0	1
390	0	0	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0	0	0
410	0	0	0	0	0	0	0	0	0	0	0
420	0	0	0	0	0	0	0	0	0	0	0
430	0	0	0	0	0	0	0	0	0	0	0
440	0	0	0	0	0	0	0	0	0	0	0
450	0	0	0	0	0	0	0	0	0	0	0
460	0	0	0	0	0	0	1	0	0	0	1
Total	42	1	30	9	12	4	5	2	3	0	108

Table 23. Length frequency of trout collected in the Clearwater River from river kilometer 65 to the mouth, 1994. Fish are listed by type and collection method. Rod and reel (r&r) and electrofishing (efish) were used.

Length (mm)	Residualized steelhead <u>adipose clip</u>		Domestic kamloop <u>LV clip</u>		Spokane rainbow <u>RV clip</u>		Hatchery rainbow <u>(no mark)</u>		Natural rainbow		Total
	r&r	efish	r&r	efish	r&r	efish	r&r	efish	r&r	efish	
170	0	4	0	0	0	0	0	0	0	2	6
180	0	4	0	0	0	0	0	0	0	0	4
190	0	1	0	0	0	0	0	0	0	0	1
200	0	2	0	0	0	0	0	0	0	0	2
210	0	2	0	0	0	0	0	0	0	1	3
220	0	1	0	0	0	0	0	0	0	0	1
230	0	1	0	0	0	0	0	0	0	0	1
240	0	5	0	0	0	0	0	0	0	5	10
250	0	3	0	1	0	0	0	0	0	0	4
260	0	2	0	0	0	0	0	0	0	0	2
270	0	1	0	0	0	0	0	0	0	1	2
280	0	4	0	0	0	0	0	0	0	0	4
290	0	5	0	0	0	0	0	0	0	0	5
300	0	4	0	0	0	0	0	0	0	0	4
310	0	0	0	1	0	0	0	0	0	0	1
320	0	0	0	0	0	0	0	0	0	0	0
330	0	0	0	0	0	0	0	0	0	0	0
340	0	0	0	0	0	0	0	0	0	0	0
350	0	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0	0	0
370	0	0	0	0	0	0	0	0	0	0	0
380	0	0	0	0	0	0	0	0	0	0	0
390	0	0	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0	0	0
410	0	0	0	0	0	0	0	0	0	0	0
420	0	0	0	0	0	0	0	0	0	0	0
430	0	0	0	1	0	0	0	0	0	0	1
Total	0	39	0	3	0	0	0	0	0	9	51

SELWAY RIVER JUVENILE CHINOOK SALMON AND ADULT STEELHEAD TROUT COLLECTION

Methods

A cooperative effort between the IDFG and the Nez Perce Tribe was initiated in 1992 to collect juvenile chinook salmon from the upper Selway River to begin an experimental broodstock program at Clearwater Fish Hatchery. Fish were collected and reared at the hatchery until spawning, at which time some of the adults may be returned to the upper Selway River and the remainder spawned at the hatchery. Net seines were used to capture juvenile chinook salmon in 1992-1994.

The Harpster Dam completely blocked anadromous fish runs into the South Fork Clearwater River drainage in the early 1900s. Since the dam was removed in the 1970s, restoration of the steelhead trout population in the drainage has been slow. Outplants of hatchery-reared steelhead trout over the past 20 years have yet to show any reasonable recovery. Hatchery-reared steelhead trout from the Dworshak National Fish Hatchery are 20 years removed from the wild and may not possess characteristics necessary for survival as a wild or natural population. The Selway River steelhead trout run was selected as the donor stock because of the similarities to the South Fork Clearwater River drainage and the presence of an existing fish tunnel in which fish could be captured with relative ease.

Results

During March 1993, 38 adult steelhead trout were collected from the fish tunnel at Selway Falls on the Selway River. Of these, 23 were females and 15 were males. Approximately 136,000 eggs were taken from these fish as they ripened at the Kamiah fish rearing facility. The eggs were fertilized at the Kamiah site and transported to the Clearwater Fish Hatchery at Ahsahka, Idaho. The chronology of the rearing cycle for these brood year 1993 steelhead is given in Table 24. These fish were reared for one year at the hatchery and released into an acclimation pond on Crooked River (tributary of South Fork Clearwater River) in 1994. The juvenile steelhead were released from the pond between April 29 and May 3, 1994 into Crooked River. A companion group of North Fork Clearwater (Dworshak) hatchery origin steelhead trout, collected at Dworshak National Fish Hatchery, were reared and released under the same conditions and schedule as the Selway River wild-origin fish.

All of the Selway River origin steelhead trout juveniles were right ventral fin-clipped and 300 were marked with PIT tags. All of the Dworshak origin juveniles were adipose fin-clipped and 476 were marked with PIT tags. The retention of the fin clips on the Selway River origin fish was

Table 24. Chronology of Selway River steelhead trout program.

	Selway stock	North Fork Clearwater stock
Spawn dates	4/8 - 5/5/93	4/16 - 5/6/93
Eggs taken	136,476	--
Eyed eggs	127,162 (93.2%)	869,000
Hatched eggs	123,435 (97%)	749,210 (86%)
Inside ponding date	4/14/93	4/16/93
Marking date	9/15-17/93 (RV)	8/23-27/93 (Ad)
Outside ponding date	9/15-17/93	8/23-27/93
Transport to acclimation pond at Crooked River	4/18/94	4/18/94
Number to acclimation pond	71,566 RV (300 PIT)	104,450 (476 PIT)
Volitional release date	4/29/94	4/29/94
Final release	5/3/94	5/3/94

disappointing (Table 25). Only 28% of the fish were found to have partial or full retention of the right ventral fin clip as opposed to 82% of the Dworshak origin fish retaining partial or complete adipose fin clips.

An important discrepancy existed between the two groups of fish at the time of release (Figure 8). The Selway River origin fish averaged 120 mm total length as compared to 185 mm total length for the Dworshak origin fish. The importance of this size discrepancy is evidenced in the rate of emigration from Crooked River in the spring of 1994. Approximately 85% of the Selway River origin fish did not emigrate from Crooked River in 1994, compared to approximately 50% of the Dworshak origin fish. These percentages are based on visual observation and PIT tag interrogation at a downstream migrant trap located near the mouth of Crooked River. From this information, it appears that juvenile steelhead trout less than 150 mm total length are reluctant to migrate. This is supported by information on wild steelhead trout migrants captured in the lower Selway River in the spring of 1993 (Figure 9). The comparison of length frequencies of Selway River origin juveniles which were released into Crooked River, and which were detected emigrating from Crooked River, is depicted in Figure 10.

It is apparent that one year hatchery rearing of wild origin steelhead trout produces fish of questionable small size to trigger emigration. Subsequent year classes of wild steelhead trout juveniles reared in hatcheries should be reared for a two year period of time.

In 1994, the Selway River steelhead trout brood program was incorporated into a hatchery versus wild performance study conducted by the National Biological Service. Thirty-one steelhead trout were captured at Selway Falls and transported to the Kamiah holding facility. Of these, 21 were females and 10 were males. A total of 101,000 eggs were taken and fertilized. For brood year 1994, fecundity averaged 4,830 eggs per female compared to 5,913 per female for brood year 1993. Hatching percentage for brood year 1994 was 73% compared to 97% for brood year 1993. Brood year 1993 eggs were fertilized on site at the Kamiah facility while the brood year 1994 eggs were transported to Dworshak National Fish Hatchery where they were fertilized.

Of the subsequent 64,000 total wild fry reared for brood year 1994, 35,000 were released into Crooked River and Twenty-Mile Creek (tributary of South Fork Clearwater River) in 1994 for performance studies in the wild. These fish are genetically marked at the dipeptidase (PEPA) locus. The remaining 29,000 juveniles are being reared at Clearwater Fish Hatchery for release in 1996.

CATCHABLE TROUT INTRODUCTIONS

Over 12,000 catchable rainbow trout were stocked in eight streams in the Clearwater Region in 1994 (Table 26).

Table 25. Fin mark quality for Selway River steelhead trout program (1994 release).

	Selway stock	North Fork Clearwater Stock
Fin clip	RV	Adipose
Excellent retention (%)	7	81
Partial retention (%) (11-25% fin retention)	21	1
Poor retention (%) (1-10% fin retention)	10	13
Unclipped or regenerated (%)	62	5

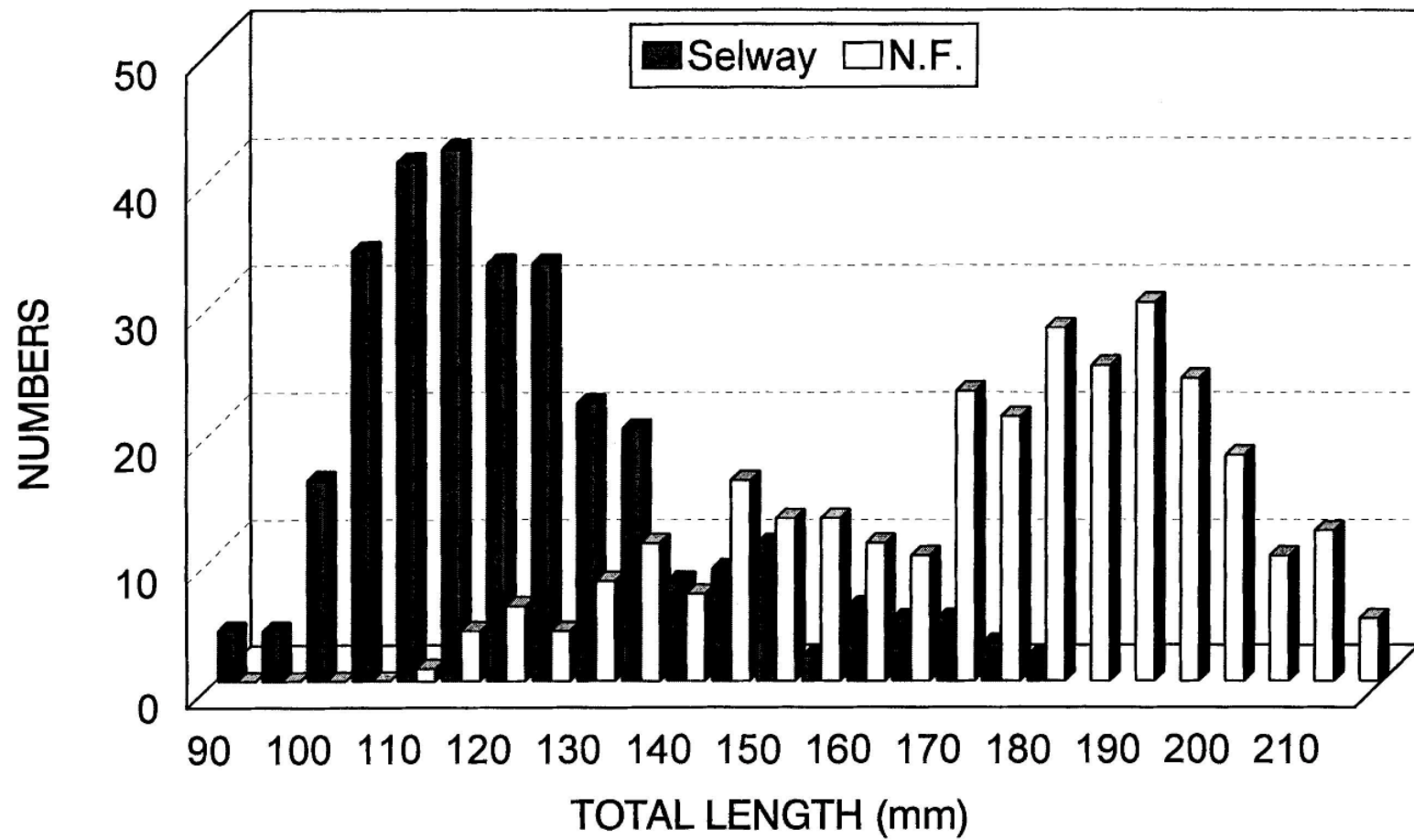


Figure 8. Length frequency of Selway River and N.F. Clearwater River origin steelhead trout released into Crooked River, Idaho, 1994.

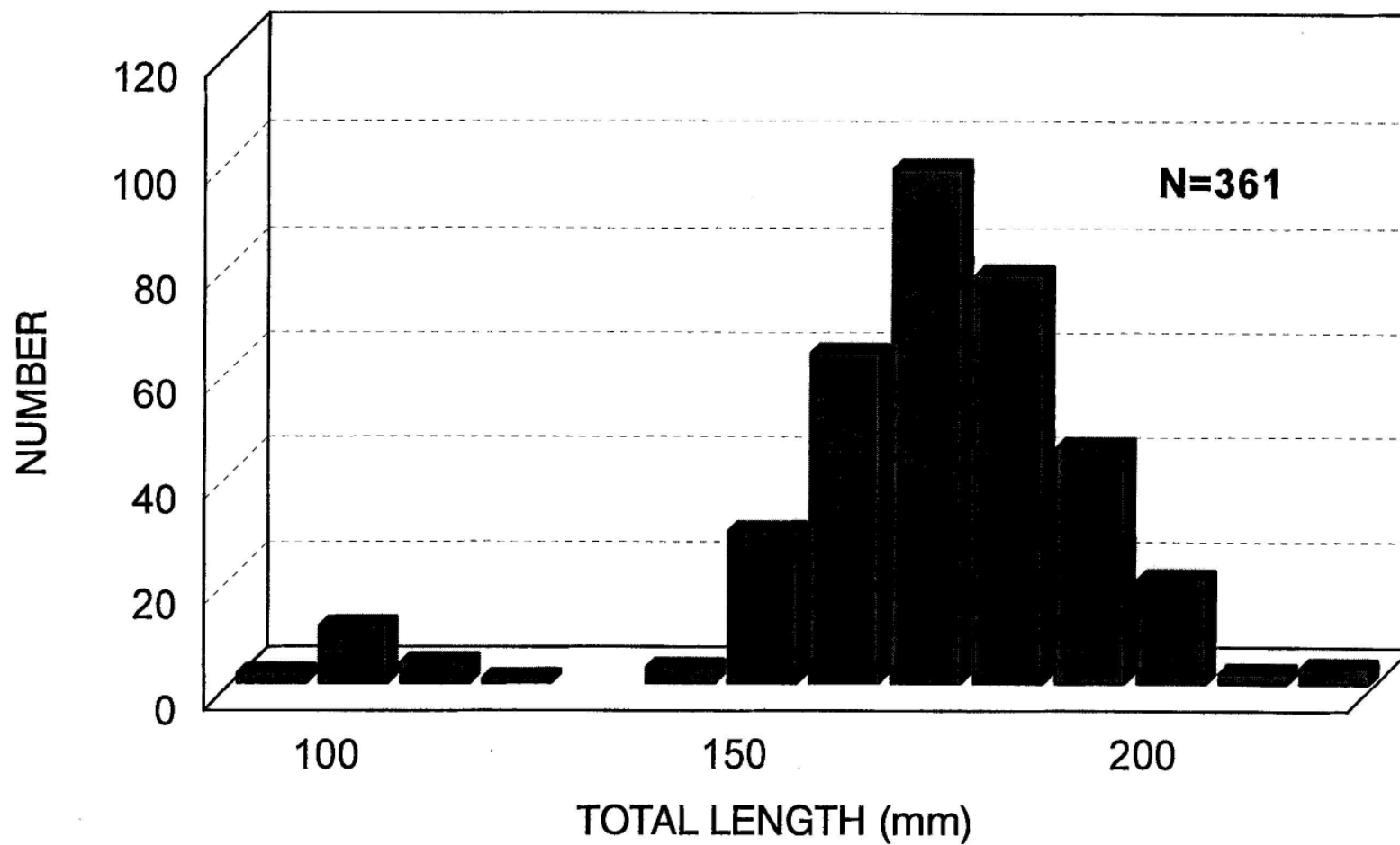


Figure 9. Length frequency of steelhead trout juveniles emigrating in Selway River, Idaho 1992. (Source: Nez Perce Tribe)

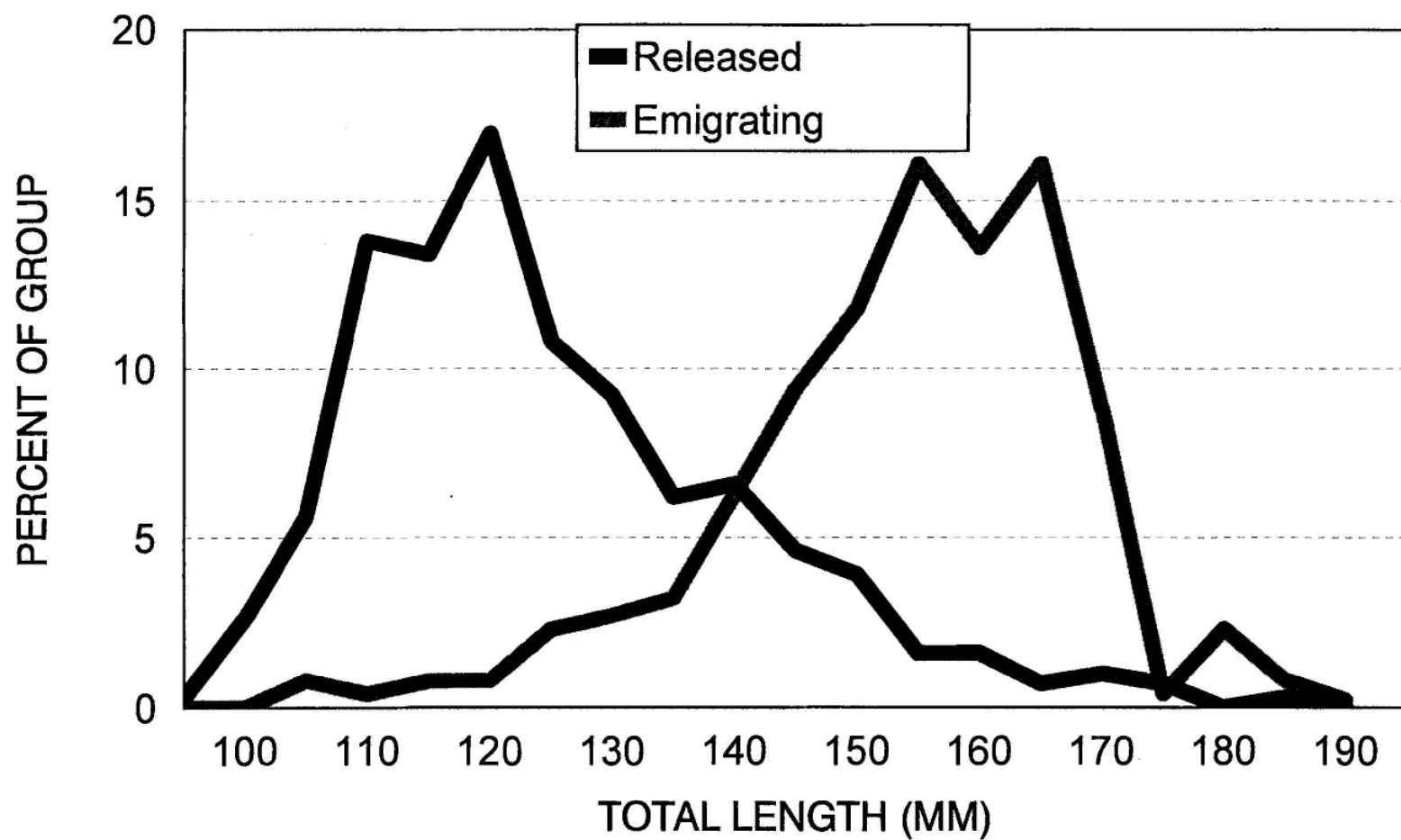


Figure 10 Length frequency of age 1 Selway River origin steelhead trout released into Crooked River and emigrating from Crooked River, Idaho , 1994.

Table 26. Catchable trout stocked in Clearwater Region streams, 1994.

Water	April	May	June	July	August	September	Total
American River	--	500	1,000	750	--	--	2,250
Big Elk Creek	--	500	750	500	--	--	1,750
Lawyers Creek	--	--	500	--	--	--	500
Orofino Creek	--	500	500	--	--	--	1,000
Palouse River	--	1,000	1,000	--	--	--	2,000
Potlatch River	--	1,000	750	--	--	--	1,750
Red River	--	500	750	500	--	--	1,750
Rhodes Creek	--	1,000	1,000	--	--	--	2,000

KOKANEE SALMON SPAWNING GROUND COUNTS

Methods

Since 1981, four to six tributaries to Dworshak Reservoir are surveyed in late September to estimate the size of the kokanee salmon spawning run from the reservoir. The survey is conducted by enumerating fish starting from the mouth of each stream upstream until kokanee are no longer observed.

Results

Results of the annual kokanee salmon spawning ground counts are given in Table 27. The total number of fish counted in three index streams was less than observed in 1993, but is still the second highest count on record.

CREEL CENSUS

Methods

Clearwater Region fish management personnel and conservation officers performed spot check creel census surveys throughout the region in 1994. Fish were separated by species or differentiated by marks on the creel form. Fish species or mark groups were also recorded by 2 cm size groups.

Results

Seventeen streams were censused on a random basis in 1994 (Table 28). Regional personnel checked 357 anglers who fished 715.25 hours. Anglers reported catching 543 game fish, averaging 0.76 fish/h.

Table 27. Number of spawning kokanee observed in selected tributaries to Dworshak Reservoir, Idaho, 1981-1994.

Stream	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Isabella Creek	4,000	5,000	2,250	9,000	10,000	--	3,520	10,960	11,830	10,535	4,053	7,085	29,171	14,613
Skull Creek	3,220	4,500	135	2,200	8,000	--	1,351	5,780	5,185	3,219	1,249	4,299	7,574	12,310
Quartz Creek	850	1,076	66	1,000	2,000	--	1,477	6,080	2,970	1,702	693	1,808	2,476	4,501
TOTAL	8,070	10,576	2,451	12,200	20,000	--	6,348	21,820	19,985	15,456	5,995	13,192	39,221	31,424
Dog Creek	--	--	--	--	--	--	700	1,720	1,720	1,875	590	1,120	6,780	1,878
Breakfast Creek	--	--	--	--	--	--	23	14,760	14,402	1,149	3,557	--	--	--
Elk Creek	--	--	--	--	--	--	30	--	--	--	--	--	--	--

Table 28. Summary of impromptu creel surveys in Clearwater Region rivers, 1994.

Date	Anglers	Total hours	CTT	RBT	K1	SHS	BKT	BULL	KOK	WF	SMB	CAT	STR	Total	CPUE
American River															
5/28	5	5.5	0	7	0	0	0	0	0	0	0	0	0	7	1.27
5/29	4	2.0	0	2	0	0	0	0	0	0	0	0	0	2	1.00
6/12	1	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0
Beaver Creek															
5/28	2	3.0	1	3	0	0	0	0	0	0	0	0	0	4	1.33
7/9	2	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crooked River															
5/28	20	30.0	0	29	0	1	0	0	0	0	0	0	0	30	1.0
Cold Springs Creek															
5/29	4	8.0	0	0	0	0	8	0	0	0	0	0	0	8	1.0
Deer Creek (Craig Mtn.)															
5/28	7	14.0	0	0	0	0	34	0	0	0	0	0	0	34	2.43
Elk Creek															
5/29	3	4.5	0	3	0	0	0	0	0	0	0	0	0	3	0.67
Lawyers Creek															
5/28	1	0.75	0	4	0	0	0	0	0	0	0	0	0	4	5.33
Lochsa River															
5/28	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14	3	24.0	31	65	0	0	0	0	0	0	0	0	0	96	4.00
7/17	18	45.0	29	38	0	0	0	0	0	0	0	0	0	67	1.49
Middle Fork Clearwater River															
6/2	2	6.0	2	0	0	0	0	0	0	0	0	0	0	2	0.33
North Fork Clearwater River															
5/28	33	34.5	13	0	0	0	0	1	0	0	0	0	0	14	0.41
5/29	15	20.0	3	1	0	0	0	2	0	0	0	0	0	6	0.30
7/2	8	8.0	11	0	0	0	0	0	0	0	0	0	0	11	1.38
7/9	8	20.0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 28.Continued.

Date	Anglers	Total hours	CTT	RBT	K1	SHS	BKT	BULL	KOK	WF	SMB	CAT	STR	Total	CPUE
Orogrande Creek															
6/26	2	0.5	0	2	0	0	0	0	0	0	0	0	0	2	4.00
7/9	7	8.0	0	7	0	0	0	0	0	0	0	0	0	7	0.88
Orofino Creek															
7/9	2	2.0	0	0	0	0	4	0	0	0	0	0	0	4	2.00
Red River															
5/28	11	14.0	0	1	0	0	0	0	0	0	0	0	0	1	0.07
5/30	6	5.0	0	14	0	0	0	0	0	0	0	0	0	14	2.80
Selway River															
5/29	3	8.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skull Creek															
7/9	5	15.0	8	0	0	0	0	0	0	1	0	0	0	9	0.60
South Fork Clearwater River															
5/28	10	12.0	0	1	0	0	1	0	0	0	0	0	0	2	0.17
5/29	15	10.0	1	0	0	0	0	0	0	3	0	0	0	4	0.40
6/4	4	3.5	0	1	0	0	0	0	0	0	0	0	0	1	0.29
6/12	5	8.5	0	0	0	0	0	0	0	0	0	0	0	0	0
7/2	4	8.0	0	1	0	0	0	0	0	0	0	0	0	1	0.13
7/3	10	11.0	0	2	0	0	0	0	0	0	0	0	0	2	0.18
7/12	7	18.5	0	0	0	0	0	0	0	0	0	0	0	0	0
7/23	10	10.0	0	17	0	0	0	0	0	0	0	0	0	17	1.70
Snake River															
3/23	10	15.0	0	0	0	0	0	0	0	0	4	0	1	5	0.33
4/1	18	36.0	0	0	0	0	0	2	0	0	7	0	2	11	0.31
5/1	5	3.0	0	12	0	0	0	0	0	0	2	0	0	14	4.67
5/6	20	66.0	0	0	0	0	0	0	0	0	68	1	5	74	1.12
5/7	22	93.0	0	11	0	0	0	0	0	0	22	0	1	34	0.37
5/21	19	77.5	0	0	0	0	0	0	0	0	1	0	4	5	0.07
6/4	27	66.0	0	0	0	0	0	0	0	0	48	0	0	48	0.73

CTT = cutthroat trout
RBT = rainbow trout
K1 = kamloop strain RBT
SHS = steelhead trout

BKT = brook trout
BULL = bull trout
KOK = kokanee salmon
WF = mountain whitefish

SMB = smallmouth bass
CAT = channel catfish
STR = white sturgeon

APPENDICES

Appendix A-1. Summary of snorkeling observations (fish/100 m sq) in the Selway River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Trout Age 0	Trout Age 1	Trout Age 2	Trout Age >2	Chinook Age 0	Chinook Age 1	Salmon	Cutthroat Trout <12 in	Cutthroat Trout >12 in	Bull Trout	Mountai Whitefis	Brook Trout	Comments
Bear Crk. (#1 ,lower)														
1986	1241	0.89	0.48	0.00	0.00	3.31	0.00	1.29	0.73	0.00	3.06	0.00		
1987	1238	0.00	2.34	0.32	0.00	0.00	1.37	0.65	0.32	0.00	0.21	0.00	WF, CT	Not verified
1988	1343	2.31	2.23	1.64	0.22	2.61	0.15	1.27	0.00	0.00	2.25	0.00	WF	Not verified
1989	1253	2.95	1.20	0.08	0.00	0.72	0.08	0.48	0.16	0.00	1.36	0.00	WF, CT	Not verified
1990	1357	5.97	2.51	0.15	0.00	2.95	0.07	0.88	0.00	0.00	1.62	0.00		
1991	974	0.00	0.00	0.21	0.10	0.00	0.00	1.64	0.10	0.10	4.21	0.00		
1992	1109	0.09	0.09	0.63	0.00	0.18	0.00	0.54	0.09	0.09	0.00	0.00		
1993	1280	0.00	0.70	0.08	0.31	0.23	0.00	0.63	0.16	0.00	0.00	0.00		
1994	1027	0.39	1.36	1.95	0.10	0.19	0.00	0.88	0.29	0.00	4.48	0.00		
Bear Crk. (#2, upper)														
1986	994	2.94	0.20	0.00	0.00	1.01	0.00	0.30	0.50	0.10	0.30	0.00		
1987	986	0.00	2.74	1.22	0.00	0.00	0.00	0.50	0.20	0.00	0.20	0.00	WF, CT	Not verified
1988	1077	1.11	2.32	0.84	1.30	0.19	0.09	0.00	0.00	0.00	0.98	0.00	WF	Not verified
1989	1903	1.73	2.00	0.58	0.00	0.00	0.00	0.52	0.00	0.05	0.00	0.00	WF, CT	Not verified
1990	1096	6.02	2.28	0.00	0.00	0.82	0.00	0.27	0.18	0.00	0.82	0.00		
1991	965	0.62	0.00	0.00	0.00	0.31	0.21	0.52	0.10	0.00	0.21	0.00		
1992	974	0.00	0.21	0.31	0.00	0.41	0.00	0.51	0.41	0.00	0.30	0.00		
1993	1012	0.40	0.89	0.20	0.00	0.00	0.00	0.30	0.30	0.00	0.00	0.00		
1994	1307	0.84	0.31	0.00	0.31	0.31	0.00	0.15	0.00	0.00	0.00	0.00		
Deer Crk. (@Cactus lower)														
1988	502	2.28	4.58	1.48	0.18	0.24	0.00	0.24	0.17	0.00	0.51	0.00		
1989	542	0.00	4.98	1.48	0.18	0.24	0.00	0.24	0.17	0.00	0.51	0.00		
1990	585	3.59	3.42	1.03	0.17	0.17	0.00	0.34	0.00	0.00	0.00	0.00		
1991	408	1.96	1.23	0.74	0.00	0.00	0.00	1.96	0.00	0.00	0.00	0.00		
1992	351	5.98	3.13	3.70	0.00	0.00	0.00	2.28	0.00	0.00	0.00	0.00		
1993	417	9.55	3.35	0.00	0.00	0.00	0.00	3.35	0.00	1.19	0.00	0.00	Not verified	
1994	360	0.55	11.65	0.00	0.28	0.00	0.00	2.77	0.00	0.15	0.28	0.00		
Deer Crk. (@Scimitar upper)														
1987	295													
1988	497	11.67	3.22	0.60	0.00	0.00	0.00	1.81	0.00	0.00	0.00	0.00		
1989	573	0.17	2.44	0.70	0.00	0.17	0.00	1.40	0.00	0.17	0.00	0.00		
1990	464	4.96	5.17	1.51	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.00		
1991	462	4.33	4.97	0.87	0.00	1.51	0.00	1.30	0.00	0.00	0.00	0.00		
1992	417	4.55	3.35	0.00	0.00	0.00	0.00	3.36	0.00	1.20	0.00	0.00		
1993	353	5.95	3.12	3.68	0.00	0.00	0.00	2.26	0.00	0.00	0.00	0.00	Not verified	
1994	662	1.36	3.63	0.45	0.00	0.00	0.00	4.23	0.00	0.15	0.00	0.00		
E.F. Moose Creek														
1988	784	3.44	4.58	2.04	0.12	1.38	0.00	0.00	0.12	0.00	0.25	0.00	WF, CT	Not verified
1989	888	3.60	0.23	0.00	0.00	0.34	0.11	0.56	0.11	0.00	0.56	0.00	WF, CT	Not verified
1990	828	5.92	4.35	2.29	0.00	0.72	2.41	0.00	0.12	0.00	2.90	0.00		
1991	2058	3.94	3.25	1.60	0.19	0.15	0.44	1.02	0.19	0.00	0.39	0.00		
1992	1416	0.00	1.13	3.18	0.14	0.79	0.00	1.34	0.35	0.00	0.07	0.00		
1993	712	1.96	3.79	2.38	0.28	1.40	0.14	0.28	0.70	0.00	0.00	0.00		
1994	604	1.99	0.99	0.17	0.00	0.66	0.00	1.82	0.33	0.00	0.82	0.00		

Stream	Area (m sq)	Steelhead Trout				Chinook		Salmon		Cutthroat Trout		Bull Trout	Mountai Whitefis	Brook Trout	Comments
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in						
Gedney Crk (#1, lower)															
1990	1289	4.66	4.42	2.02	0.39	0.08	0.00	0.00	0.00	0.00	0.00	0.39	0.00		
1991	1289	4.47	1.78	1.40	0.62	0.00	0.00	0.47	0.00	0.00	0.00	0.23	0.00		
1992	1474	1.97	4.14	2.10	0.14	0.41	0.00	0.07	0.07	0.00	0.00	0.61	0.00		
1993	1338	0.97	1.57	2.99	1.64	0.07	0.07	0.30	0.00	0.00	0.00	0.22	0.00		
1994	691	7.24	3.19	3.62	0.72	107.59	0.00	0.00	0.00	0.00	0.00	0.14	0.00	Mostly hatchery chinook	
Gedney Crk(#2, upper)															
1990	1054	4.27	5.41	2.85	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.00		
1991	537	9.31	5.22	3.17	0.56	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.00		
1992	552	5.08	3.26	2.36	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.54	0.00		
1993	434	2.31	5.07	5.31	0.23	0.46	0.00	1.84	0.00	0.00	0.00	0.00	0.00		
1994	339	10.33	5.91	4.31	0.59	19.19	0.00	0.00	0.00	0.00	0.00	0.88	0.00	Mostly hatchery chinook	
Little Clearwater R (upper)															
1994	591	0.00	2.71	1.52	0.00	1.02	0.00	0.83	0.50	0.00	0.00	0.00	0.00		
Little Clearwater R (lower)															
1994	241	0.00	2.08	0.41	0.00	0.83	0.00	0.81	0.00	0.41	0.00	0.00	0.00		
Marten Crk															
1992	303	0.00	16.48	3.96	0.99	0.00	0.00	0.99	0.66	0.00	1.61	0.00	0.00		
1993	171	4.07	5.82	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Not verified	
1994	145	2.76	8.95	5.51	0.69	0.00	0.00	0.69	0.69	0.00	0.00	0.00	0.00		
Meadow Crk (@Slims Camp, lower)															
1988	3553	0.31	0.00	0.03	0.00	0.84	0.00	0.08	0.00	0.00	0.00	0.00	0.00	WF not verified	
1989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
1990	1584	0.82	3.72	2.02	0.25	0.06	0.06	0.13	0.00	0.00	0.38	0.00	0.00		
1991	1584	0.44	0.25	1.33	0.44	0.51	0.06	0.06	0.00	0.00	0.19	0.00	0.00		
1992	1650	0.55	1.39	1.21	0.00	0.42	0.00	0.06	0.00	0.00	0.24	0.00	0.00		
1993	1697	0.24	0.29	0.77	0.12	0.59	0.00	0.29	0.00	0.12	0.29	0.00	0.00		
1994	1670	0.06	2.87	1.08	0.12	0.66	0.00	0.72	0.00	0.00	0.18	0.00	0.00		
Meadow Crk (#2, upper)															
1990	2262	0.35	1.77	1.77	0.13	0.49	0.09	0.09	0.04	0.00	0.27	0.00	0.00		
1991	2524	0.71	0.16	0.44	0.04	0.71	0.20	0.36	0.00	0.00	0.04	0.00	0.00		
1992	2926	0.55	0.31	0.27	0.00	1.44	0.00	0.48	0.03	0.00	0.14	0.00	0.00		
1993	2572	0.00	0.08	0.04	0.04	0.12	0.00	0.23	0.00	0.00	0.08	0.00	0.00		
1994	2482	0.00	0.52	0.08	0.00	1.05	0.00	0.97	0.00	0.00	0.00	0.00	0.00		
Moose Crk. (#1@Mouth)															
1987	912	1.75	1.10	0.77	0.11	0.22	0.00	0.11	1.54	0.00	0.00	0.00	0.00	WF not verified	
1988	1540	0.06	0.26	0.19	0.00	0.00	0.00	0.46	0.13	0.06	6.09	0.00	0.00	Resident fish not verified	
1989	1629	0.06	0.25	0.43	0.00	0.00	0.00	0.80	0.06	0.00	6.51	0.00	0.00	WF, CT not verified	
1990	2160	0.28	0.46	0.14	0.00	0.00	0.00	0.37	0.09	0.00	4.63	0.00	0.00		
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
1992	2173	0.00	0.18	0.74	0.18	0.37	0.05	0.83	0.09	0.00	1.24	0.00	0.00		
1993	259	0.39	2.77	4.08	0.39	0.00	0.00	0.96	0.19	0.00	0.00	0.00	0.00		
1994	2000	0.00	4.40	4.65	0.35	0.00	0.00	0.30	0.05	0.00	2.10	0.00	0.00		

Appendix A-1 (Cont). Summary of snorkeling observations (fish/100 m sq) in the Selway River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Age 0	Age 1	Age 2	Age	Chinook Salmon >2 Age 0	Cutthroat Trout Age 1	<12 in	>12 in	Bull Trout	Mountai Whitefls	Brook Trout	Comments
Moose Crk. (#2@Confluence of NF and EF)													
1988	3480	1.27	0.47	0.00	0.00	0.15	0.00	0.24	0.00	0.00	0.06	0.00	
1989	3059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	???
1990	2525	0.63	0.12	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	
1991	913	1.86	1.20	0.55	0.00	0.00	2.30	0.55	0.11	0.00	0.22	0.00	
1992	NA	0.82	0.21	0.02	0.04	0.25	0.00	0.51	0.00	0.00	10.00	0.00	
1993	2536	1.97	1.50	0.04	0.00	0.00	0.00	0.32	0.08	0.00	0.27	0.00	Not verified
1994	1520	0.39	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Not verified
N.F. Moose Crk.													
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1989	3059	0.10	0.00	0.00	0.00	0.03	0.00	0.10	0.06	0.00	1.34	0.00	WF, CT not verified
1990	2263	0.84	1.94	1.15	0.44	0.09	0.00	0.40	0.04	0.00	0.22	0.00	
1991	2158	1.53	2.41	1.99	0.19	0.00	2.13	1.39	0.19	0.00	1.02	0.00	
1992	2703	1.58	1.78	1.29	0.18	0.22	0.00	0.92	0.37	0.07	2.86	0.00	
1993	2030	0.74	2.02	1.28	0.00	0.00	0.00	0.59	0.20	0.00	0.00	0.00	
1994	1530	3.46	2.94	3.33	0.85	0.98	0.00	1.37	0.59	0.00	1.70	0.00	
Ohara Crk(# 1 @meadow)													
1993	795	5.91	1.76	2.01	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	
1994	287.	2.79	8.01	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00	
Ohara Crk (#2@canyon)													
1993	467	6.64	5.79	2.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1994	340	11.77	10.30	0.88	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	
Otter Crk.													
1988	177	10.17	5.08	0.00	0.00	0.00	0.00	3.37	1.12	0.00	0.00	0.00	Resident fish not verified
1989	194	14.92	5.14	5.14	0.51	0.00	0.00	3.09	0.51	0.00	0.00	0.00	CT not verified
1990	100	11.28	11.79	4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Resident fish not verified
1991	215	5.58	8.37	2.79	0.93	0.00	0.00	0.47	0.00	0.00	0.00	0.00	
1992	176	0.00	12.49	11.54	1.70	0.00	0.00	0.57	0.57	0.00	0.00	0.00	
1993	230	3.91	9.55	2.17	0.87	0.00	0.00	2.17	0.00	0.00	0.00	0.00	
1994	186	1.61	11.81	4.83	0.00	3.22	0.00	8.06	4.30	0.00	0.00	0.00	
Running Crk. (#1@Pack Br,lower)													
1985	572	2.80	0.70	0.00	0.18	0.00	0.00	0.36	0.00	0.00	0.36	0.00	
1986	870	2.99	1.03	0.00	0.00	2.18	0.00	0.46	0.11	0.00	0.11	0.00	
1987	875	0.00	2.17	1.83	0.00	0.57	0.00	0.91	0.23	0.00	0.00	0.00	
1988	869	6.68	2.19	0.12	0.00	0.00	0.00	0.23	0.46	0.00	0.80	0.00	WF not verified
1989	823	1.34	0.49	0.00	0.00	0.00	0.12	0.49	0.00	0.00	0.12	0.00	WF, CT not verified
1990	986	2.94	0.81	0.10	0.00	0.00	0.00	0.61	0.00	0.10	0.20	0.00	
1991	831	1.80	0.48	0.60	0.00	0.60	0.00	0.84	0.00	0.12	0.24	0.00	
1992	994	0.10	0.80	0.50	0.00	0.00	0.00	1.11	0.30	0.00	0.20	0.00	
1993	834	2.40	1.20	0.24	0.00	0.00	0.00	0.24	0.00	0.00	0.12	0.00	
1994	681	1.32	0.44	0.59	0.15	0.00	0.00	0.88	0.15	0.00	0.15	0.00	

Appendix A-1 (Con't). Summary of snorkeling observations fish/100 m sq) in the Selway River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in	Bull Trout	Mountai Whitefis	Brook Trout	Comments
Running Crk. (#2@Eagle Crupper)													
1985	366	2.46	1.64	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1986	730	1.78	0.41	0.00	0.00	0.27	0.00	0.14	0.00	0.00	0.14	0.00	
1987	781	0.00	1.66	1.54	0.00	0.26	0.00	1.10	0.00	0.26	0.39	0.00	WF, CT not verified
1988	833	3.24	4.68	0.36	0.00	0.00	0.00	0.96	0.12	0.00	0.24	0.00	WF not verified
1989	841	3.80	2.02	1.30	0.00	0.00	0.00	0.47	0.00	0.00	0.11	0.00	WF, CT not verified
1990	891	1.46	0.45	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	
1991	1177	0.51	1.36	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.51	0.00	
1992	515	2.53	2.91	0.00	0.00	0.00	0.00	2.14	0.19	0.00	0.19	0.00	
1993	325	0.00	2.77	0.92	0.00	0.31	0.00	0.62	0.00	0.00	0.12	0.00	WF not verified
1994	623	0.00	1.28	4.01	0.16	0.00	0.00	0.16	0.32	0.00	2.09	0.00	
Selway River at Hells Half Acre													
1985	1426	1.33	0.28	1.54	0.28	1.40	0.00	0.56	0.14	0.00	0.21	0.00	
1986	1552	0.00	1.29	1.16	0.13	0.26	0.60	0.71	0.06	0.06	0.64	0.00	
1987	1552	0.00	1.03	1.55	0.45	0.71	0.13	0.64	0.06	0.00	0.52	0.00	
1988	1630	0.37	0.68	1.04	0.06	0.74	0.06	0.31	0.00	0.00	0.18	0.00	
1989	1395	0.07	0.29	0.22	0.00	0.36	0.00	0.29	0.07	1.36	0.43	0.00	
1990	1637	0.12	1.10	0.92	0.00	1.53	0.24	0.55	0.00	0.00	0.43	0.00	
1991	1043	0.19	2.79	0.96	0.00	1.44	0.29	0.19	0.00	0.10	0.77	0.00	
1992	1355	0.07	1.62	0.44	0.00	0.89	0.07	0.37	0.00	0.00	0.59	0.00	
1993	1373	0.00	1.24	0.36	0.07	1.24	0.00	0.51	0.00	0.00	0.73	0.00	
1994	1040	0.19	2.60	0.10	0.00	2.40	0.00	1.06	0.00	0.00	0.48	0.00	
Selway River at Little Clearwater R.													
1985	1897	1.95	1.05	0.11	0.00	0.42	0.00	0.11	0.11	0.00	0.05	0.00	
1986	1512	0.40	0.73	0.13	0.13	8.99	0.00	0.07	0.07	0.07	0.40	0.00	
1987	1512	0.26	0.07	0.13	0.00	1.65	0.00	0.00	0.13	0.00	0.07	0.00	
1988	1739	2.01	0.65	0.12	0.11	2.53	0.00	0.00	0.00	0.00	0.00	0.00	
1989	1571	4.20	0.95	0.19	0.00	2.23	0.00	0.45	0.00	0.06	0.13	0.00	
1990	1599	0.06	0.63	0.13	0.00	5.07	0.19	0.31	0.00	0.06	0.19	0.00	
1991	2218	2.98	0.18	0.09	0.00	1.40	0.00	0.00	0.00	0.05	0.00	0.00	
1992	893	0.00	1.23	0.78	0.11	1.79	0.11	0.90	0.22	0.00	1.34	0.00	
1993	1653	0.00	0.18	0.06	0.00	1.09	0.00	0.00	0.12	0.06	0.00	0.00	
1994	1263	1.50	1.42	0.16	0.00	6.97	0.00	0.32	0.24	0.24	0.95	0.00	
Selway River above Beaver Point at Magruder Crossing													
1987	2699	1.33	0.52	0.70	0.04	19.45	0.56	0.15	0.00	0.15	0.74	0.00	
1988	2683	1.49	1.12	0.41	0.00	25.57	0.45	0.11	0.07	0.00	0.93	0.00	
1989	4134	0.60	1.43	1.09	0.07	23.85	0.10	0.34	0.15	0.24	0.75	0.00	
1990	4236	5.36	1.58	0.50	0.28	8.52	0.78	0.78	0.00	0.19	0.35	0.00	
1991	3031	2.87	0.82	0.92	0.20	9.57	0.73	0.82	0.16	0.00	0.13	0.99	
1992	2312	0.13	0.69	0.39	0.04	4.28	0.00	0.26	0.13	0.00	0.00	0.00	
1993	2145	0.61	0.47	0.00	0.00	0.05	0.00	0.19	0.00	0.00	0.00	0.00	
1994	1997	0.45	1.50	0.30	0.05	2.35	0.00	0.20	0.00	0.00	0.30	0.00	

Stream	Area (m sq)	-----Steelhead Trout-----				Chinook Salmon		Cutthroat Trout		Bull Trout	Mountai Whitefis	Brook Trout	Comments
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in				
Three Links													
1988	266	6.39	12.03	8.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Not verified
1989	276	8.33	7.24	3.98	0.00	4.71	0.00	1.45	0.36	0.00	0.00	0.00	CT not verified
1990	260	6.91	17.28	9.60	1.92	0.00	0.00	0.77	0.77	0.00	0.00	0.00	
1991	294	1.70	11.92	2.72	0.34	0.00	0.00	1.70	0.68	0.00	0.34	0.00	
1992	315	4.76	2.54	2.22	0.32	0.00	0.00	2.86	0.00	0.00	0.00	0.00	
1993	672	1.34	6.40	3.42	0.30	0.00	0.00	0.00	0.45	0.00	0.00	0.00	
1994	332	5.72	9.63	6.62	0.30	5.12	0.00	1.81	0.60	0.00	0.00	0.00	
White Cap Crk (#1@mouth,lower)													
1985	365	1.12	0.00	1.12	0.00	0.00	0.00	0.28	0.00	0.00	0.56	0.00	Not verified
1986	430	0.23	1.16	0.23	0.00	0.70	0.00	0.00	0.00	0.00	0.23	0.00	
1987	1364	0.00	0.95	1.03	0.15	3.15	0.22	0.51	0.00	0.00	1.47	0.00	
1988	1267	0.00	1.58	1.74	0.00	0.39	0.08	0.71	0.00	0.00	1.58	0.00	
1989	1479	0.00	1.01	1.49	0.07	0.14	0.07	1.14	0.13	0.20	1.42	0.00	
1990	1410	0.00	2.13	1.49	0.14	0.14	0.21	2.34	0.00	0.14	1.20	0.00	
1991	869	0.00	0.92	3.45	0.00	0.00	0.35	1.15	0.00	0.00	1.04	0.00	
1992	867	1.38	3.81	0.69	0.00	0.12	0.00	1.50	0.00	0.00	1.04	0.00	Not verified
1993	823	0.00	1.46	1.22	0.00	0.00	0.24	0.24	0.12	0.00	1.46	0.00	
1994	1101	0.00	2.09	1.09	0.00	0:18	0.18	2.36	0.82	0.00	1.27	0.00	
White Cap Crk (#2@wilderness,middle)													
1985	923	0.00	0.11	0.65	0.00	0.76	0.00	0.36	0.18	0.00	0.33		Not verified
1986	923	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.11	0.00	0.33	0.00	
1987	1432	0.00	0.35	1.19	0.14	0.14	0.21	0.42	0.00	0.00	0.98	0.00	
1988	1368	0.00	0.58	0.44	0.00	0.15	0.00	0.07	0.07	0.00	0.95	0.00	
1989	1534	0.00	0.52	1.04	0.13	0.20	0.00	0.20	0.00	0.00	0.65	0.00	
1990	1713	0.06	1.11	0.53	0.23	0.58	0.00	0.29	0.06	0.06	0.29	0.00	
1991	1358	0.00	0.37	0.74	0.15	0.00	0.66	0.88	0.07	0.00	0.22	0.00	
1992	1363	0.00	1.69	0.44	0.00	0.00	0.00	1.25	0.00	0.00	0.44	0.00	Not verified
1993	626	0.00	1.60	1.44	0.00	0.00	1.44	0.16	0.32	0.00	3.35	0.00	
1994	1054	0.09	1.90	0.85	0.09	0.38	0.00	1.04	0.38	0.00	0.76	0.00	
White Cap Crk (upper)													
1987	2199	0.00	0.09	0.23	0.18	0.91	0.09	0.27	0.09	0.00	0.68	0.00	
1988	1820	1.54	0.99	0.88	0.11	2.53	0.00	0.55	0.22	0.00	1.92	0.00	
1989	2055	0.00	1.12	1.70	0.05	0.78	0.00	1.02	0.05	0.00	0.73	0.00	
1990	2235	0.00	0.98	0.72	0.13	0.40	0.04	0.18	0.04	0.04	0.22	0.00	
1991	1287	0.08	1.17	1.32	0.31	0.00	0.70	0.86	0.23	0.00	1.32	0.00	
1992	2251	0.09	0.40	0.13	0.18	0.00	0.00	3.86	0.00	0.04	0.18	0.00	
1993	1115	1.17	0.09	4.30	4.12	0.09	3.05	1.26	0.18	0.00	0.00	0.00	
1994	1486	1.28	2.29	0.61	0.00	3.03	0.00	1.89	0.00	0.14	0.42	0.00	

Appendix A-2. Summary of snorkeling observations (fish/100 m_{sq}) in the main Clearwater River drainage, 1985-94. Verified from General Parr Monitoring Database

Stream	Area (m sq)	Age 0	Steelhead Trout			Chinook Salmon			Cutthroat Trout		Bull Trout	Mountain Whitefish	Brook trout	Comments
			Age 1	Age 2	Age	>2 Age 0	Age 1		<12 in	>12 in				
Big Canyon Crk (#1@dirtpile)														
1986	165.00	24.85	7.88	0.61	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1987	165.00	3.64	6.06	3.64	1.21	0.00	0.00	0.00	0.00	0.00	0.61	0.00	0.00	
1988	165.00	1.82	4.85	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1989	165.00	5.54	3.03	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1990	121.00	4.13	8.26	2.48	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1992	202.00	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1993	235.00	13.19	5.11	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	
1994	205.00	24.37	0.49	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Big Canyon Crk (#2@bridge)														
1990	406.00	5.18	4.44	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1991	228.00	9.21	1.32	3.07	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	
1992	410.00	3.17	1.22	0.24	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	
1993	578.00	3.11	1.90	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.73	
1994	467.00	3.21	0.64	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Eldorado Crk (Below 1 B)														
1986	394.00	6.62	7.89	0.76	0.00	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1987	371.00	2.16	5.12	2.42	0.00	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1988	429.00	29.82	11.18	1.40	0.23	5.82	0.00	1.17	0.00	0.00	0.00	0.93	0.23	
1989	571.00	17.33	1.93	0.88	0.00	1.58	0.00	0.00	0.00	0.00	0.00	0.35	0.00	
1990	429.00	8.39	12.81	1.40	0.00	0.47	0.00	0.00	0.00	0.00	0.00	1.17	0.00	
1991	454.00	14.09	4.18	4.40	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.88	0.44	
1992	405.00	0.00	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	
1993	456.00	0.00	0.66	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1994	445.00	4.04	2.47	0.45	0.00	13.47	0.22	0.90	0.00	0.00	0.00	0.22	0.00	
Eldorado Crk (Above 2LG)														
1986	536.00	4.82	4.08	0.19	0.00	61.41	0.00	0.19	0.00	0.00	0.00	0.00	0.00	
1987	712.00	0.28	1.40	0.42	0.00	1.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1988	714.00	0.28	0.14	0.00	0.00	78.29	0.14	0.14	0.00	0.00	0.00	0.00	0.00	
1989	660.00	34.70	0.15	0.30	0.15	9.70	0.15	0.00	0.00	0.00	0.00	0.00	0.00	
1990	705.00	0.14	2.55	0.14	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.14	
1991	754.00	0.00	0.93	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1992	662.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1993	752.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1994	636.00	0.00	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Eldorado Crk (Above 1HG)														
1986	758.00	16.75	11.08	0.00	0.00	0.53	0.00	2.11	0.00	0.00	0.00	0.00	0.00	
1987	700.00	1.57	7.29	0.57	0.00	11.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1988	687.00	2.62	0.87	0.15	0.00	0.15	0.00	0.15	0.00	0.00	0.00	0.00	0.00	
1989	697.00	56.10	1.15	0.00	0.00	6.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1990	800.00	0.62	8.12	1.12	0.00	0.50	0.14	0.00	0.00	0.00	0.00	0.00	0.00	
1991	837.00	1.19	0.84	2.39	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1992	842.00	0.00	0.36	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1993	933.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	
1994	700.00	0.14	0.29	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Stream	Area (m sq)	Steelhead Trout				Chinook Salmon		Cutthroat Trout		Bull Trout	Mountain Whitefish	Brook trout	Comments
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in				
Lolo Crk (Upstream run7)													
1986	443.00	10.61	0.90	1.35	0.00	1.13	0.23	0.00	0.00	0.00	0.23	0.00	
1987	443.00	4.29	9.49	1.81	0.00	4.07	0.00	0.00	0.00	0.00	0.00	0.00	
1988	485.00	6.44	4.37	0.92	0.23	62.82	0.69	0.00	0.00	0.00	0.69	0.00	
1989	558.00	1.97	1.08	1.08	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	
1990	602.00	2.16	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	
1991	575.00	9.22	2.61	0.35	0.00	4.87	0.00	0.17	0.00	0.00	0.00	0.18	
1992	540.00	1.30	2.96	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1993	564.00	0.35	1.06	0.35	0.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00	
1994	523.00	2.87	0.76	0.19	0.00	9.17	0.00	0.00	0.00	0.00	1.34	0.19	
Lolo Crk (Upstream 8360)													
1986	547.00	2.93	1.10	0.18	0.00	0.37	0.00	0.00	0.00	0.00	0.00	0.00	
1987	547.00	3.11	5.48	1.46	0.00	9.69	0.37	0.18	0.00	0.00	1.10	0.00	
1988	490.00	9.18	2.24	0.20	0.00	45.29	1.22	0.00	0.00	0.00	0.00	0.00	
1989	522.00	1.53	2.30	0.00	0.00	12.45	0.00	0.00	0.00	0.00	0.00	0.00	
1990	580.00	10.68	0.52	0.17	0.00	1.21	0.00	0.00	0.00	0.00	0.34	0.00	
1991	534.00	17.22	2.06	0.94	0.56	7.49	0.00	0.00	0.00	0.00	0.00	0.00	
1992	641.00	3.28	5.77	0.47	0.00	0.31	0.00	0.00	0.00	0.00	0.16	0.00	
1993	573.00	0.00	1.57	387.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	
1994	562.00	5.87	3.02	0.00	0.00	6.41	0.00	0.00	0.00	0.00	0.18	0.00	
Lolo Crk (Downstream run6)													
1986	689.00	9.71	7.54	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1987	652.00	0.15	0.31	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1988	558.00	6.28	4.12	2.51	0.00	11.66	0.00	0.00	0.00	0.00	0.72	0.00	
1989	642.00	17.12	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.00	
1990	738.00	7.45	7.05	0.81	0.00	7.18	0.14	0.14	0.00	0.00	0.00	0.14	
1991	1461.00	15.81	3.22	1.78	0.14	0.82	0.00	0.00	0.00	0.00	0.55	0.00	
1992	1398.00	4.22	1.72	0.14	0.00	0.21	0.00	0.00	0.00	0.00	0.50	0.00	
1993	1598.00	0.56	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	
1994	1435.00	0.84	0.63	0.28	0.00	1.11	0.00	0.00	0.00	0.00	0.35	0.00	
Lolo Crk (downstream DS6)													
1986	588.00	6.28	14.43	2.04	0.17	1.19	0.00	0.00	0.00	0.00	0.68	0.00	
1987	588.00	1.02	5.10	1.87	0.17	9.01	0.00	0.00	0.17	0.00	3.91	0.00	
1988	628.00	9.87	7.01	1.59	0.32	14.65	0.16	0.00	0.00	0.00	2.71	0.00	
1989	628.00	17.04	0.16	0.00	0.00	1.91	0.00	0.00	0.00	0.00	0.96	0.00	
1990	677.00	28.52	12.12	1.92	0.44	19.36	0.00	0.00	0.00	0.00	0.15	0.00	
1991	1281.00	18.26	3.36	3.90	0.31	2.26	0.00	0.16	0.00	0.00	0.70	0.16	
1992	1358.00	8.03	3.24	0.15	0.00	2.14	0.00	0.00	0.00	0.00	0.66	0.00	
1993	1566.00	0.77	0.13	0.13	0.06	0.00	0.00	0.00	0.00	0.00	0.26	0.00	
1994	1412.00	3.97	1.70	0.14	0.00	8.15	0.00	0.00	0.00	0.00	1.20	0.00	

Appendix A-2 Con't . Summary of snorkeling observations fish/100 m sq) in the main Clearwater River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Steelhead Trout				Chinook Salmon		Cutthroat Trout		Bull Trout	Mountain Brook	Comments
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in		Whitefish trout	
EF Potlatch River (@middle)												
1992	359.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00		0.003.63
1993	350.00	2.29	0.29	0.29	0.00	0.00	0.00	0.00	0.00	0.00		0.001.72
1994	231.00	0.00	0.00	0.43	0.00	0.00	0.00	0.43	0.00	0.00		0.000.00
EF Potlatch River (@corrals)												
1992	187.00	4.28	1.07	1.07	0.00	0.00	0.00	3.74	0.00	0.00		0.0044.97
1993	150.00	3.34	5.34	0.67	0.00	0.00	0.00	0.00	0.00	0.00		0.0020.01
1994	108.00	0.00	8.34	0.93	0.00	0.00	0.00	0.00	0.00	0.00		0.0025.95

Stream	Area (m sq)	Steelhead Trout Age 0	Age 1	Age 2	Age >2	Chinook Salmon Age 0	Cutthroat Trout Age 1	<12 in	>12 in	Bull Trout	Mountain Whitefish	Brook trout	Comments
Brushy Fork (#1 @Pack Cr)													
1988	310	8.06	5.16	0.97	2.26	12.89	0.00	0.00	0.00	0.00	0.00	0.00	
1989	370	2.43	6.49	3.51	0.00	9.46	0.54	0.00	0.00	0.00	0.00	0.00	CT&WF not verified
1990	316	1.27	6.96	3.48	3.48	1.58	3.80	0.32	0.00	0.00	0.95	0.00	
1991	316	2.85	5.38	1.90	3.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1992	329	0.00	0.91	0.91	0.30	0.61	0.00	0.00	0.61	0.00	0.30	0.00	
1993	412	0.49	2.18	1.21	0.49	0.24	0.00	0.48	0.24	0.00	0.48	0.00	
1994	339	0.59	1.77	0.88	0.00	5.90	0.00	0.00	0.00	0.29	0.29	0.00	
Brushy Fork (#2,above Pack Cr)													
1988	324	3.40	0.62	1.54	1.85	19.75	0.00	0.00	0.00	0.00	0.00	0.00	
1989	367	3.27	3.81	3.00	0.00	11.98	1.09	0.00	0.00	0.00	0.27	0.00	CT&WF not verified
1990	336	3.57	9.52	5.06	7.14	10.12	4.46	0.00	0.00	0.00	0.60	0.00	
1991	336	3.57	1.79	1.19	0.89	0.30	0.00	0.00	0.00	0.00	0.00	0.00	
1992	349	0.29	2.86	1.43	0.00	0.29	0.00	0.00	0.00	0.00	0.29	0.00	
1993	372	3.23	4.57	1.35	0.00	0.27	0.00	1.61	0.00	0.00	0.00	0.32	
1994	313	0.32	5.75	3.83	0.00	5.11	0.00	0.00	0.00	0.32	0.00	0.00	
Colt Crk(@Pack Cr)													
1987	319	0.00	0.00	0.00	0.00	0.00	0.00	3.76	0.00	0.00	0.00	0.00	
1988	215	0.00	0.00	0.00	0.00	0.00	0.00	5.58	0.00	0.00	0.00	0.00	
1989	310	0.00	0.00	0.00	0.00	64.50	0.00	3.87	0.00	0.00	0.00	0.00	
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1991	269	0.00	1.12	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.00	
1992	188	0.00	0.00	0.00	0.00	0.00	0.00	3.19	0.00	0.00	0.00	0.00	
1993	229	0.00	0.00	0.00	0.00	0.00	0.00	4.37	0.00	0.00	0.00	0.00	
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not snorkeled
Crooked Fork Crk (#1B,Lower)													
1986	2998	11.94	0.30	0.20	0.00	2.30	0.00	0.03	0.00	0.00	0.07	0.00	
1987	2360	16.87	1.19	0.38	0.00	15.00	0.04	0.42	0.00	0.04	0.00	0.00	
1988	2770	12.02	4.19	0.97	2.09	8.56	0.04	0.33	0.11	0.11	0.00	0.00	CT not verified
1989	2783	15.68	4.92	0.09	0.00	12.74	0.00	2.08	0.09	0.28	0.01	0.00	
1990	2003	11.38	2.65	2.15	4.90	3.30	0.70	2.20	0.50	0.20	1.00	0.00	
1991	1971	6.80	1.17	1.52	0.00	0.71	0.00	0.00	0.27	0.54	0.00	0.00	
1992	1954	0.41	0.00	0.05	0.00	0.00	0.00	0.20	0.00	0.00	0.20	0.00	
1993	1742	10.68	0.69	0.29	0.00	3.04	0.00	0.17	0.00	0.00	0.80	0.00	
1994	1789	1.17	0.11	0.00	0.00	0.56	0.00	0.06	0.11	0.00	1.23	0.00	
Crooked Fork Crk (#2B,Upper)													
1986	3053	9.53	1.18	0.66	0.00	5.76	0.00	0.00	0.07	0.00	1.60	0.00	
1987	2520	6.43	1.35	0.36	0.00	2.86	0.00	0.00	0.00	0.00	1.71	0.00	
1988	2895	6.18	2.45	2.25	2.34	3.39	0.03	1.04	0.00	0.25	0.00	0.00	CT not verified
1989	2685	9.80	4.10	1.38	0.00	12.96	0.00	0.62	0.45	0.00	0.15	0.00	CT not verified
1990	2441	8.73	4.22	3.32	1.80	7.41	0.20	0.40	0.10	0.10	0.00	0.00	
1991	2311	13.28	1.04	0.82	0.00	1.56	0.09	0.00	0.00	0.00	0.00	0.00	
1992	2791	1.25	0.00	0.04	0.00	0.00	0.00	2.20	0.00	0.00	0.90	0.00	
1993	2041	5.29	1.22	0.39	0.00	1.86	0.00	2.55	0.15	0.26	0.88	0.00	
1994	1676	5.07	0.83	0.42	0.00	2.39	0.00	0.12	0.00	0.00	0.18	0.00	

Appendix A-3 (Con't). Summary of snorkeling observations (fish/100 m sq) in the Lochsa River drainage, 1986-94. Verified from General Parr Monitoring Database.

Stream	Area				Chinook	Salmon	Cutthroat Trout		Bull	Mountain	Brook	Comments
	Steel				Age 0	Age 1	<12 in	>12 in	Trout	Whitefish	trout	
	head Trout											
Fire Crk (lower)												
1990	390	7.69	17.43	5.90	0.77	0.00	0.00	1.54	0.00	0.26	0.26	0.00
1991	595	11.93	6.89	2.86	0.67	0.00	0.17	1.68	0.00	0.00	0.00	0.00
1992	600	4.33	6.83	2.50	0.50	0.00	0.00	0.05	0.00	0.00	0.33	0.00
1993	333	0.00	0.90	0.60	0.00	0.00	0.00	1.20	0.00	0.00	0.00	0.00
1994	406	4.90	7.39	2.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fire Crk (upper)												
1990	426	6.34	14.32	8.45	0.23	0.70	0.00	0.23	0.00	0.00	0.00	0.00
1991	409	8.55	10.26	8.80	2.93	0.00	0.00	2.93	0.00	0.00	0.00	0.00
1992	494	6.89	11.35	2.84	0.00	0.00	0.00	0.04	0.00	0.00	0.20	0.00
1993	637	0.00	0.47	0.78	0.00	0.00	0.16	2.98	0.00	0.16	0.00	0.00
1994	104	2.88	13.46	13.46	3.85	0.00	1.92	0.96	0.00	0.00	0.00	0.00
Hopeful Crk(1A)												
1986	771	0.00	0.00	0.00	0.00	12.32	0.00	4.15	0.00	0.00	0.00	0.00
1987	745	0.00	0.13	0.13	0.00	1.48	0.00	3.76	0.00	0.00	0.00	0.00
1988	741	0.13	0.94	0.13	0.00	28.60	0.00	5.67	0.00	0.27	0.00	0.00
1989	732	0.14	0.00	0.00	0.00	7.25	0.00	2.87	0.00	0.14	0.00	0.00
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1992	311	0.00	0.32	0.00	0.00	0.00	0.00	2.56	0.32	0.00	0.00	0.00
1993	350	0.00	0.00	0.00	0.00	0.00	0.00	1.14	0.00	0.00	0.00	0.00
1994	325	0.00	0.31	0.00	0.00	0.00	0.00	3.08	0.00	0.00	0.00	0.00
Fish Crk (lower)												
1988	1565	9.97	7.29	3.52	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
1989	2252	6.62	5.99	2.53	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00
1990	2211	8.41	7.78	3.08	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1991	2858	7.21	5.56	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1992	1720	8.67	0.35	0.38	0.29	0.32	0.00	0.00	0.00	0.00	0.00	0.00
1993	926	7.13	6.70	4.00	0.97	0.00	0.00	0.00	0.00	0.00	0.11	0.00
1994	791	7.45	11.75	5.56	0.13	0.00	0.00	0.25	0.00	0.00	0.00	0.00
Fish Crk (upper)												
1988	550	15.26	13.81	4.18	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1989	726	11.43	6.06	4.27	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.00 CT not verified
1990	725	15.45	13.93	4.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1991	779	7.31	9.24	3.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1992	650	16.16	15.08	3.08	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00
1993	639	11.27	11.43	9.08	1.56	0.00	0.00	0.63	0.00	0.00	0.31	0.00
1994	674	11.14	20.64	5.05	0.15	0.00	0.00	0.30	0.00	0.00	0.00	0.00
Lochsa River (@ Pete King Crk)												
1988	10527	0.02	0.00	0.00	0.01	0.00	0.00	0.02	0.04	0.00	0.75	0.00 Not verified
1989	11795	0.03	0.04	0.02	0.01	0.00	0.00	0.02	0.03	0.00	0.16	0.00 Not verified
1990	10789	0.02	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00
1991	11081	0.01	0.01	0.00	0.01	0.03	0.01	0.01	0.00	0.00	0.38	0.00
1992	8432	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.00
1993	12563	0.01	0.00	0.01	0.02	0.00	0.00	0.01	0.02	0.00	0.48	0.00
1994	7819	0.04	0.00	0.01	0.05	0.00	0.00	0.00	0.01	0.00	0.69	0.00

Appendix A-3 (Con't). Summary of snorkeling observations (fish/100 m sq) in the Lochsa River drainage, 1986-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Age 0	Age 1	Age 2	Age >2	Steelhead Trout Age 0	Chinook Age 1	Salmon <12 in	Cutthroat Trout >12 in	Bull Trout	Mountain Whitefish	Brook trout	Comments
Lochsa River (@Fish Crk, L1)													
1986	5140	0.23	1.11	0.16	0.00	0.14	0.02	0.06	0.00	0.00	0.49	0.00	
1987	4752	0.46	0.65	0.78	0.23	0.23	0.00	0.42	0.36	0.04	0.00	0.00	WF not verified
1988	4441	1.15	0.34	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1989	4075	1.94	0.29	0.66	0.00	1.35	0.07	0.49	0.32	0.00	2.13	0.00	
1990	6238	0.11	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.26	0.00	
1991	3816	2.07	0.21	0.34	0.03	0.24	0.08	1.02	0.21	0.03	3.30	0.00	
1992	3360	0.09	0.09	0.03	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	
1993	5415	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.06	0.00	0.61	0.00	
1994	6004	0.02	0.07	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.57	0.00	
Lochsa River (@Saddle Camp, L3)													
1988	5769	1.59	0.42	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
1989	6474	0.02	0.02	0.08	0.00	0.02	0.00	0.00	0.00	0.00	0.37	0.00	
1990	6568	1.19	0.38	0.29	0.06	0.12	0.00	0.06	0.05	0.00	0.43	0.00	
1991	6862	0.67	0.48	0.48	0.06	0.28	0.39	0.16	0.09	0.00	1.24	0.00	
1992	5863	0.05	0.07	0.02	0.00	0.05	0.05	0.51	0.07	0.00	0.00	0.00	
1993	4881	0.16	0.08	0.08	0.00	0.02	0.00	0.70	0.18	0.00	1.800.00		
1994	7586	0.00	0.07	0.15	0.03	0.00	0.00	0.21	0.25	0.00	1.110.00		
Lochsa River (@Papoose Crk, L4)													
1987	5350	0.15	0.21	0.24	0.00	0.00	0.00	0.00	0.04	0.00	0.52	0.00	
1988	6428	0.45	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.000.00		
1989	5746	0.42	0.16	0.24	0.03	0.00	0.00	0.03	0.00	0.00	0.700.00		
1990	7378	1.18	0.28	0.04	0.04	0.84	0.05	0.27	0.34	0.00	0.50	0.00	
1991	6078	0.39	0.05	0.03	0.00	0.03	0.00	0.05	0.05	0.00	0.67	0.00	
1992	3858	0.13	0.00	0.00	0.00	0.03	0.00	0.05	0.41	0.00	0.000.00		
1993	7977	0.26	0.21	0.00	0.00	0.00	0.00	0.05	0.40	0.00	1.490.00		
1994	3270	0.18	0.00	0.18	0.00	0.18	0.00	0.21	0.12	0.00	0.000.00		
Old Man Crk													
1988	142	15.51	44.40	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.000.00		
1989	164	0.61	27.44	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.000.00		
1990	168	10.70	26.74	14.85	0.00	0.00	0.00	1.80	0.19	0.00	0.00	0.00	
1991	169	5.92	16.57	14.20	4.14	0.00	0.00	2.37	0.00	0.00	0.000.00		
1992	125	30.50	56.98	6.42	0.00	0.00	0.00	0.80	0.80	0.00	0.000.00		
1993	185	3.24	8.10	22.69	4.86	0.00	0.00	0.00	0.00	0.00	0.000.00		
1994	954	4.30	7.13	0.84	0.42	0.21	0.31	0.73	0.31	0.00	2.100.00		
Post Office Crk (lower)													
1988	156	20.25	1.28	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.000.00		
1989	253	11.45	1.18	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.000.00	CT not verified	
1990	249	25.07	6.43	2.01	0.00	0.00	0.00	3.21	0.00	0.40	0.000.00		
1991	186	10.22	3.23	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.000.00		
1992	126	0.79	4.75	1.58	1.62	0.00	0.00	22.22	0.00	0.00	0.000.00		
1993	178	5.61	0.00	1.12	0.00	0.00	0.00	6.18	0.00	0.00	0.000.00		
1994	120	5.05	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000.00		

Appendix A-3 (Con't). Summary of snorkeling observations (fish/100 m sq) in the Lochsa River drainage, 1986-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Steelhead Trout				Chinook Salmon		Cutthroat Trout		Bull Trout	Mountain Whitefish	Brook trout	Comments
		Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in				
Post Office Crk (upper)													
1988	462	17.97	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 CT not verified
1989	400	23.77	4.00	1.50	0.00	0.00	0.00	0.75	0.00	0.00	0.00	0.00	
1990	613	20.27	8.32	1.13	0.200.00	0.00	0.00	0.70	0.00	0.20	0.00	0.00	
1991	764	4.58	1.57	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1992	334	44.58	6.58	0.60	0.00	0.00	0.00	2.10	0.00	0.00	0.00	0.00	
1993	168	22.04	0.00	0.00	0.00	0.00	0.00	15.48	0.00	0.00	0.00	0.00	
1994	227	24.27	11.03	0.88	0.00	0.00	0.00	0.88	0.00	0.00	0.00	0.00	
Split Crk (lower)													
1990	545	10.28	4.96	3.85	0.551.65	0.00	0.18	0.00	0.00		0.920.00		
1991	540	7.22	1.67	2.41	0.561.85	0.19	0.55	0.00	0.00		0.000.00		
1992	519	13.10	15.02	4.24	0.370.00	0.00	0.39	0.00	0.00		0.190.00		
1993	660	0.30	1.52	1.52	0.150.00	0.00	5.15	0.00	0.00		0.000.00		
1994	468	12.39	2.78	0.21	0.00	0.64	0.00	0.43	0.21	0.00	0.00	0.00	
Split Crk (upper)													
1990	326	10.74	16.88	6.14	1.840.00	0.00	1.23	0.61	0.00		0.61	0.00	
1991	504	9.33	2.98	3.17	0.400.00	0.00	1.39	0.00	0.00		0.40	0.00	
1992	424	6.60	8.49	8.73	0.000.00	0.00	1.42	0.00	0.00		0.470.00		
1993	380	0.53	0.53	0.53	0.00	0.00	0.00	10.00	0.00	0.00		0.000.00	
1994	475	12.62	3.79	3.79	0.21	0.00	0.00	0.21	0.00	0.00	0.00	0.00	
Warm Springs Crk(@mouth)													
1989	880	1.36	0.57	0.00	0.00	0.34	0.00	0.00	0.00	0.00		0.000.00	
1990	854	6.09	3.04	1.64	0.590.00	0.00	0.23	0.00	0.23	0.35	0.23		
1991	875	3.43	2.86	0.91	0.910.57	0.23	0.23	0.34	0.00		0.000.00		
1992	784	1.02	1.79	0.89	0.000.00	0.00	1.27	0.77	0.13		0.000.00		
1993	1136	0.53	0.09	1.06	0.000.18	0.00	0.88	0.00	0.00		0.260.00		
1994	1008	1.69	0.69	0.30	0.00	1.59	0.10	1.59	0.89	0.10	0.00	0.00	
White Sands Crk(WS1)													
1986	3980	0.40	0.55	0.30	0.100.68	0.00	0.00	0.00	0.00		0.000.00		
1987	3980	2.21	0.58	0.30	0.000.33	0.00	0.00	0.00	0.00		0.000.00		
1988	3950	0.18	0.89	0.43	0.030.30	0.00	0.13	0.00	0.02		0.000.00		
1989	3980	1.66	0.25	0.18	0.000.05	0.00	0.00	0.00	0.00		0.000.00		
1990	4141	1.79	0.36	0.34	0.020.05	0.00	0.02	0.00	0.00		0.000.00		
1991	3661	4.56	0.11	0.11	0.140.33	0.00	0.03	0.03	0.00		0.000.00		
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1993	3944	0.10	0.10	0.08	0.100.00	0.25	0.15	0.08	0.00		0.050.00		
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not snorkeled	

Appendix A-4. Summary of snorkeling observations (fish/100 m sq) in the Salmon River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area	Steelhead Trout	Chinook Age 0	Salmo Age 1	Cutthroat Trout <12 in	Trout >12 in	Bull Trout	Mountain Whitefish	Brook Trout	Comments
Bargamin Crk (lower)										
1985	303	1.98	1.32	4.30	0.66	0.00	0.33	0.00	0.00	0.99 ND
1986	248	0.00	6.05	4.44	0.40	0.00	0.00	0.00	0.00	3.23 0.00
1987	248	0.00	8.87	6.05	0.40	0.00	0.00	0.00	0.00	1.61 0.00
1988	482	0.41	2.90	2.28	0.00	0.00	0.00	0.00	0.00	0.42 0.00
1989	714	0.00	4.20	1.68	0.14	0.00	0.28	0.00	0.00	0.42 ND Not verified
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not verified
1991	250	0.00	4.40	3.20	1.20	0.00	0.00	0.00	0.00	5.20 ND Not verified
1992	377	0.00	2.92	2.65	0.00	0.00	0.53	0.00	0.00	0.80 ND Not verified
1993	632	0.00	3.16	2.06	0.16	0.00	0.16	0.16	0.00	0.00 0.00 Not verified
1994	664	0.16	1.09	1.09	0.00	0.00	0.60	0.00	0.30	0.30 0.00
Bargamin Crk (upper)										
1985	491	0.81	1.22	2.65	0.20	0.00	0.20	0.00	0.00	0.60 ND
1986	403	0.00	3.72	4.96	0.74	0.00	0.00	0.00	0.00	3.23 0.00
1987	403	0.00	5.96	8.44	0.49	0.00	0.49	0.00	0.00	2.73 0.00
1988	537	0.56	3.17	2.42	0.19	0.00	0.00	0.19	0.00	0.56 0.00
1989	601	0.00	3.49	1.50	0.33	0.00	0.00	0.17	0.00	0.50 ND Not verified
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not verified
1991	1058	0.95	1.32	0.76	0.00	0.00	0.47	0.00	0.09	0.95 ND Not verified
1992	556	0.00	5.75	2.88	0.00	0.00	1.08	0.18	0.00	0.54 ND Not verified
1993	530	0.00	2.64	2.64	0.00	0.00	0.00	0.19	0.00	0.37 0.00 Not verified
1994	540	0.74	1.85	3.15	0.37	0.00	0.00	1.85	0.37	0.19 1.11 0.00
Crooked Crk (lower)										
1993	708	0.71	2.68	0.71	0.04	0.00	0.00	0.40	0.00	0.00 1.83 0.00
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not snorkeled, angler in section
Crooked Crk (upper)										
1993	581	1.89	2.58	0.34	0.86	0.00	0.00	0.00	0.00	0.00 0.00 0.00
1994	537	4.65	1.49	1.67	0.00	0.00	0.00	0.00	0.00	0.93 0.00 0.00
Indian Cr										
1993	144	0.70	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Water too low
Jersey Crk										
1993	336	1.49	2.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00
1994	145	6.20	0.00	0.69	0.00	0.00	0.00	0.69	0.00	0.00 0.00 0.00
John Day Crk (lower)										
1991	148	0.00	4.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00 ND
1992	172	4.06	1.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00
1993	142	0.00	5.63	2.81	0.00	1.41	0.00	0.00	0.00	0.00 0.00 0.00
1994	165	0.00	7.24	2.41	0.00	5.43	0.00	0.00	0.00	0.00 0.00 0.00
John Day Crk (upper)										
1991	139	1.04	8.01	0.35	0.00	0.00	0.00	0.00	0.00	0.00 ND
1992	170	1.18	1.76	0.59	0.00	0.00	0.00	0.00	0.00	0.00 0.00 0.00
1993	150	2.01	5.37	1.34	1.33	0.00	0.00	0.00	0.00	1.51 0.00 0.00
1994	175	2.85	9.13	4.57	2.86	0.00	0.00	0.57	0.00	0.00 0.00 0.00

Appendix A-4 (Con't). Summary of snorkeling observations (fish/100 m sq) in the Salmon River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area				Ste	Chinook	Salmo	Cutthroat	Trout	Bull	Mountai	Brook	Comments
	elhead Trout					Age 0	Age I	<12 in	>12 in	Trout	Whitefis	Trout	
Race Crk													
1991	232	6.47	6.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	
1992	286	18.88	8.39	2.80	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1993	427	1.17	4.92	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND	
1994	290	21.07	19.34	2.42	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sheep Crk (lower)													
1986	257	0.00	1.95	2.33	0.00	0.00	0.00	0.00	0.00	0.00	2.33	0.00	
1987	311	0.00	0.00	1.93	0.00	0.32	0.00	0.00	0.00	0.00	4.82	0.00	
1988	361	1.11	0.83	0.83	0.00	0.00	0.00	0.28	0.00	0.55	4.99	0.00	
1989	357	0.00	2.80	1.96	0.00	0.84	0.00	0.56	0.00	0.00	1.40		ND Not verified
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not verified
1991	315	0.32	5.40	3.17	0.00	1.27	0.00	0.63	0.00	0.32	3.49		ND Not verified
1992	307	0.65	2.93	0.65	0.00	0.00	0.00	0.30	0.00	0.00	3.33		ND Not verified
1993	838	1.91	2.86	0.47	0.00	0.00	0.00	0.00	0.00	0.12	0.59		ND Not verified
1994	500	0.20	1.00	1.00	0.20	2.60	0.00	0.20	0.00	0.00	1.80		ND
Sheep Crk (upper)													
1986	92	1.09	10.87	16.30	0.00	0.00	0.00	0.00	0.00	0.00	5.43	0.00	
1987	92	0.00	10.87	18.48	0.00	0.00	0.00	0.00	0.00	0.00	3.26	0.00	
1988	75	18.59	10.62	5.31	0.00	0.00	0.00	0.00	4.00	1.33	20.00	0.00	
1989	200	0.00	5.50	4.00	1.50	0.50	0.00	0.00	0.00	0.00	4.50		ND Not verified
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not verified
1991	103	0.00	8.72	4.84	0.00	0.00	0.00	4.85	0.97	0.97	4.85		ND Not verified
1992	188	0.00	0.00	3.72	0.00	0.00	0.00	0.00	0.00	0.00	3.62		ND Not verified
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not snorkeled
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not snorkeled
Skookumchuck Crk (lower)													
1991	290	8.79	2.49	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND Not verified
1992	322	10.87	7.45	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1993	490	2.86	6.74	4.90	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1994	251	33.92	5.99	3.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skookumchuck Crk (upper)													
1991	233	0.85	1.29	2.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ND Not verified
1992	278	5.04	1.08	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA Not snorkeled
1994	246	7.67	8.48	4.44	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slate Crk (RM 4.3, #2)													
1988	688	6.48	12.95	10.22	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1989	785	0.00	3.95	9.30	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00
1990	816	5.39	4.90	0.74	0.00	1.23	1.59	0.00	0.00	0.00	0.00	0.00	0.00
1991	744	13.71	7.93	2.02	0.27	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.00
1992	650	6.92	6.92	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1993	785	0.25	4.46	2.17	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1994	910	1.32	2.53	1.32	0.11	3.08	0.11	2.64	0.00	0.00	0.11	0.00	0.00

Appendix A-4 (Con't). Summary of snorkeling observations (fish/100 m sq) in the Salmon River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Age 0	Steelhead Trout Age 1	Age 2	Age >2	Chinook Age 0	Salmo Age 1	Cutthroat Trout <12 in	>12 in	Bull Trout	Mountai Whitefis	Brook Trout	Comments
Slate Crk (RM 4.3, #2)													
1988	688	6.48	12.95	10.22	0.58	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1989	785	0.00	3.95	9.30	3.69	0.00	0.00	0.00	0.00	0.00		0.38	0.00
1990	816	5.39	4.90	0.74	0.00	1.23	1.59	0.00	0.00	0.00		0.00	0.00
1991	744	13.71	7.93	2.02	0.27	0.00	1.08	0.00	0.00	0.00		0.00	0.00
1992	650	6.92	6.92	1.69	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1993	785	0.25	4.46	2.17	0.00	0.76	0.00	0.00	0.00	0.00		0.00	0.00
1994	910	1.32	2.53	1.32	0.11	3.08	0.11	2.64	0.00	0.00		0.11	0.00
Slate Crk (RM6.7, #3)													
1988	877	11.92	7.86	3.97	0.32	1.05	0.40	0.00	0.00	0.00		0.08	0.00
1989	5421	0.89	1.03	1.53	0.00	0.04	0.04	0.00	0.00	0.00		0.00	0.00
1990	733	22.37	8.32	2.59	0.55	1.19	1.77	0.00	0.00	0.00		0.00	0.00
1991	1135	19.82	5.64	2.55	1.50	0.00	2.82	0.17	0.09	0.00		0.00	0.00
1992	785	4.97	10.71	2.93	0.00	0.25	0.00	0.00	0.00	0.00		0.00	0.00
1993	650	0.62	3.54	1.08	0.00	0.46	0.00	0.15	0.00	0.00		0.00	0.15
1994	538	0.56	2.79	1.67	1.12	1.30	0.00	3.53	0.00	0.00		0.00	0.00
Slate Crk (RM 8.1, #4)													
1988	242	2.89	16.12	8.26	0.00	0.00	1.24	0.00	0.00	0.00		0.41	0.00
1989	311	2.89	15.11	7.07	1.61	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1990	319	12.55	5.02	2.51	1.88	2.20	1.26	0.00	0.00	1.57		0.31	0.00
1991	262	18.71	14.89	3.82	2.67	1.53	1.15	0.00	0.00	0.00		0.00	0.00
1992	211	5.21	16.57	2.84	0.00	0.95	0.47	0.00	0.00	0.00		0.00	0.00
1993	211	0.00	8.05	1.42	0.00	0.00	0.00	1.89	0.00	0.00		0.00	0.00
1994	217	0.92	3.23	5.53	0.00	2.77	0.46	0.92	0.00	0.00		0.00	0.00
Slate Crk (RM 12.1, #6)													
1988	571	8.41	6.30	4.73	1.05	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1989	595	0.17	5.54	2.52	0.34	0.17	0.00	0.00	0.00	0.00		0.00	0.00
1990	637	7.06	2.83	0.63	0.31	1.26	0.47	0.00	0.00	0.31		0.00	0.00
1991	917	0.76	4.25	1.20	0.33	0.98	0.22	0.00	0.00	0.11		0.00	0.00
1992	618	2.59	4.53	2.10	0.00	2.75	0.00	0.00	0.00	0.16		0.32	0.00
1993	618	1.46	3.56	1.46	0.00	1.13	0.00	0.00	0.00	0.00		0.00	0.00
1994	582	0.17	2.58	2.92	0.00	15.99	0.17	1.38	0.00	0.00		0.34	0.00
S.F. Skookumchuck Crk													
1991	51.8	0.00	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	ND Not verified
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA Not verified
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA Not verified
1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA Not verified
S.F. White Bird Crk (lower)													
1988	92	68.48	34.78	2.17	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1989	126	10.36	19.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1990	95	9.45	7.35	2.10	0.00	0.00	0.00	0.00	0.00	0.00		0.00	ND
1991	96	8.33	9.38	4.17	1.04	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1992	295	0.00	1.02	4.41	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1993	269	4.46	4.84	1.12	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
1994	200	0.00	10.02	1.00	0.00	0.50	0.00	0.00	0.00	0.00		0.00	0.00

Appendix A-4 (Con't). Summary of snorkeling observations (fish/100 m sq) in the Salmon River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Age 0	Age 1	Age 2	Age >2	Chinook Age 0	Salmo Age 1	Cutthroat <12 in	Trout >12 in	Bull Trout	Mountai Whitefis	Brook Trout	Comments
S.F. White Bird Crk (upper)													
1988	119	30.33	16.01	14.92	2.520.84	0.00	0.00	0.00	0.00			0.000.00	
1989	125	4.80	30.42	0.80	0.000.00	0.00	0.00	0.00	0.00			0.000.00	
1990	94	8.46	16.93	2.12	4.230.00	0.00	0.00	0.00	0.00			0.00	ND
1991	139	20.16	10.80	5.04	1.440.00	0.00	0.00	0.00	0.00			0.000.00	
1992	295	0.00	1.02	4.41	0.000.00	0.00	0.00	0.00	0.00			0.000.00	
1993	342	3.22	3.80	2.63	0.290.00	0.00	0.00	0.00	0.00			0.000.00	
1994	210	0.48	12.86	2.86	0.950.48	0.00	0.00	0.00	0.00			0.000.00	
White Bird Crk													
1986	660	1.97	16.67	7.12	1.671.21	0.00	0.00	0.00	0.00			0.000.00	
1987	890	0.67	0.79	1.01	0.110.67	0.00	0.00	0.00	0.00			0.000.00	
1988	174	60.99	33.95	25.89	4.020.00	0.00	0.00	0.00	0.00			0.000.00	
1989	260	15.01	21.93	9.23	0.380.00	0.00	0.00	0.00	0.00			0.000.00	
1990	122	29.53	26.96	5.78	0.000.00	0.00	0.00	0.00	0.00			0.00	ND Not verified
1991	207	16.94	20.81	6.78	0.480.00	0.00	0.00	0.00	0.00			0.000.00	
1992	407	0.00	1.48	4.67	1.970.00	0.00	0.00	0.00	0.00			0.000.00	
1993	170	1.18	7.08	2.36	0.590.00	0.00	0.00	0.00	0.00			0.000.00	
1994	538	0.56	5.76	1.30	0.190.00	0.00	0.00	0.00	0.00			0.000.00	

Appendix A-5. Summary of snorkeling observations (fish/100 m sq) in the South Fork Clearwater River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area	Steelhead Trout				Chinook Salmon		Cutthroat Trout		Bull Trout	Mountain Whitefish	Brook trout	Comments
	(m sq)	Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in				
American River (Strata 2, #1)													
1986	372	1.07	9.92	0.80	0.00	1.07	0.00	6.99	0.00	0.00	0.27	0.00	
1987	442	0.00	8.37	0.68	0.00	0.00	0.00	0.45	0.00	0.00	1.81	0.00	
1988	449	0.00	1.78	1.11	0.00	74.29	0.45	0.00	0.00	0.00	2.23	0.00	
1989	396	0.25	5.05	0.25	0.00	164.56	0.00	0.25	0.00	0.00	1.01	0.00	
1990	434	1.84	12.21	1.61	0.46	0.23	0.00	0.00	0.00	0.00	0.23	1.38	
1991	428	0.47	2.57	0.70	0.23	0.23	0.00	1.64	0.00	0.00	0.23	0.00	
1992	411	0.24	0.97	0.49	0.00	16.77	0.00	0.24	0.00	0.00	1.22	0.00	
1993	385	0.78	0.52	0.26	0.00	1.30	0.00	0.00	0.00	0.00	0.00	0.52	
1994	293	0.00	2.73	0.00	0.00	70.00	0.00	0.34	0.00	0.00	2.05	0.34	
American River (Strata3, #2)													
1986	548	19.23	15.93	0.73	0.00	7.69	0.00	0.00	0.00	0.18	3.65		
1987	581	0.00	14.12	0.34	0.00	2.41	0.00	0.00	0.00	0.00	2.58	0.00	
1988	548	29.57	5.48	2.01	0.18	8.94	0.18	0.00	0.00	0.00	1.64	0.00	
1989	502	7.17	6.97	1.99	0.00	0.80	0.00	0.00	0.00	0.00	1.59	0.00	
1990	534	10.50	10.50	2.81	1.31	0.94	0.00	0.00	0.00	0.19	1.12	0.00	
1991	794	0.25	3.15	0.63	0.13	0.00	0.13	2.39	0.00	0.00	0.76	0.25	
1992	650	22.91	4.46	1.23	0.00	0.92	0.15	0.00	0.00	0.00	13.54	0.00	
1993	694	0.00	0.86	0.86	3.46	0.00	0.00	0.00	0.00	0.00	1.87	0.58	
1994	499	0.00	2.81	0.40	0.60	44.50	0.00	0.00	0.00	0.00	2.20	0.00	
Johns Crk (#1 @Mouth)													
1988	373	7.25	4.29	2.68	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	
1989	653	6.89	6.13	1.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1990	493	2.43	5.27	0.20	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00	
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1992	411	0.00	6.32	1.85	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Not verified
1993	554	0.00	2.17	1.80	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	
1994	428	3.73	0.23	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	
Johns Crk (#2@rm 1.0)													
1988	354	6.78	6.50	4.24	0.00	1.13	0.00	0.00	0.00	0.00	0.60	0.00	
1989	356	14.61	9.27	1.97	0.00	0.00	0.56	0.00	0.00	0.00	0.56	0.00	
1990	167	8.99	26.36	5.99	0.00	0.80	0.00	0.00	0.00	0.60	2.40	0.00	
1991	323	7.12	9.60	2.79	0.00	0.00	0.30	0.00	0.00	0.00	2.00	0.00	
1992	303	0.00	7.92	1.98	0.66	0.00	0.00	0.33	0.00	0.00	1.32	0.00	
1993	399	0.00	4.26	9.28	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	
1994	338	2.96	2.66	5.03	0.30	2.66	0.00	0.30	0.00	0.00	0.59	0.00	
Johns Crk (#3@ Open Crk)													
1988	1466	1.02	3.89	1.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1989	1904	1.73	2.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1991	460	0.87	5.00	1.96	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	
1992	559	0.72	3.23	0.72	0.00	0.00	0.00	0.18	0.00	0.18	0.00	0.00	
1993	559	0.00	2.50	1.61	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	
1994	406	0.00	0.99	0.99	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	

Appendix A.5 Cont. Summary of snorkeling observations (fish/100 m sq) in the South Fork Clearwater River drainage, 1985-94. Verified from General Parr Monitoring Databases

Stream	Area (m sq)	Age 0	Age 1	Age 2	Age >2	Chinook Age 0	Chinook Age 1	Cutthroat <12 in	Cutthroat >12 in	Bull Trout	Mountain Whitefish	Brook trout	Comments
Johns Crk (#4@upper, .25mile above Open Cr)													
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1989	1362	0.59	0.59	0.44	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1991	176	0.00	3.98	2.28	0.00	0.00	0.00	0.00	0.00	1.14	1.14	0.00	
1992	398	0.00	2.77	1.51	1.01	0.00	0.00	0.25	0.00	0.00	0.00	0.00	
1993	2760.00		3.26	2.17	0.36	0.00	0.00	0.36	0.00	0.00	0.00	0.00	
1994	3230.00		0.31	1.24	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	
Moores Crk (#1,lower)													
1992	990.00		1.01	0.00	0.00	0.00	0.00	6.06	0.00	0.00	0.00	0.00	
1993	100	0.00	5.98	1.000.00	0.00	0.00	0.00	4.00	0.00	1.00	0.00	0.00	
1994	620.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Moores Crk (#2,upper)													
1992	1260.00		0.00	0.00	0.00	0.00	0.00	18.25	0.00	2.38	0.00	0.00	
1993	274	0.00	4.02	5.12	0.00	0.00	0.00	1.09	0.00	1.82	0.00	0.00	
1994	2570.00		0.00	0.000.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	
Meadow Crk (@meadow)													
1987	41086.01		13.40	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	
1988	331107.40		3.33	0.60	0.00	62.61	0.00	0.91	0.00	0.00	0.00	0.00	
1989	455	4.61	2.86	2.200.30	11.20	0.00	0.22	0.22	0.00	0.00	0.00	0.00	
1990	4610.00		8.24	1.950.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1991	3761.06		3.72	1.33	1.06	0.00	0.00	1.33	0.00	0.00	0.00	1.06	
1992	2770.36		10.82	1.440.00	0.00	0.00	0.36	0.36	0.00	0.00	0.00	0.72	
1993	336	0.30	0.30	1.490.59	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.30	
1994	382	0.14	2.64	1.57	0.26	16.75	0.00	0.00	0.00	0.00	0.00	7.92	
Meadow Crk (@MP2)													
1987	56811.97		10.92	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1988	540	0.93	10.19	0.19	0.00	1.67	0.00	0.00	0.00	0.00	0.00	0.00	
1989	5250.19		7.43	1.33	0.00	37.15	1.91	0.00	0.00	0.00	0.00	0.00	
1990	624	9.78	6.57	1.76	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	
1991	6231.61		1.12	0.480.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.32	
1992	5251.52		6.29	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1993	510	12.16	0.00	2.160.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1994	31110.95		5.47	2.90	0.00	6.44	0.00	0.00	0.00	0.00	0.00	0.00	
Newsome Crk (@4miles)													
1986	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1987	870	0.57	5.29	0.11	0.00	0.00	0.34	1.95	0.00	0.11	1.49	0.00	
1988	787	0.00	2.54	0.13	0.00	14.49	0.00	0.00	0.00	0.13	3.68	0.00	
1989	862	5.11	0.12	0.12	0.00	4.29	0.58	0.00	0.00	0.12	1.51	0.00	
1990	1206	0.25	3.32	1.41	0.00	11.03	0.17	0.16	0.00	0.00	1.91	0.00	
1991	666	2.10	2.25	0.30	0.00	5.40	1.65	0.00	0.00	0.30	1.35	0.00	
1992	519	1.93	6.17	0.00	0.00	5.8	0.19	0.00	0.00	0.00	6.94	0.00	
1993	570	2.10	0.35	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	
1994	468	0.43	4.7	1.71	0.21	90.6	0.21	0.21	0.00	0.00	1.28	0.00	

Appendix A 5 Cont. Summary of snorkeling observations (fish/100 m sq) in the South Fork Clearwater River drainage, 1985-94. Verified from General Parr Monitoring Databas

Area	Steelhead Trout				Chinook Salmon				Cutthroat Trout		Bull	Mountain	Brook	
Stream	(m sq)	Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in	Trout	Whitefish	trout	Comments	
Newsome Cr(@oldside)														
1986	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1987	120	3.35	56.07	2.51	0.00	3.35	18.41	1.67	0.00	0.00	0.00	0.00	0.00	
1988	150	0.00	20.00	6.67	0.67	108.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	
1989	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1990	100	0.00	5.00	4.00	0.00	40.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
1991	205	0.00	2.44	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1992	309	0.00	4.86	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88	0.00	
1993	322	24.85	0.00	0.00	0.00	1.86	0.00	0.00	0.00	0.00	0.00	2.17	0.00	
1994	425	0.00	3.06	0.00	0.00	78.29	0.00	0.00	0.00	0.00	0.24	0.71	0.00	
Newsome Cr(@newside, 7miles)														
1986	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1987	881	5.00	11.58	0.34	0.00	7.95	0.34	0.79	0.00	0.34		3.18	0.00	
1988	1170	0.85	6.15	2.22	0.00	27.08	2.31	0.00	0.00	0.00		0.00	0.00	
1989	1399	2.50	0.79	0.93	0.00	40.47	1.64	0.00	0.00	0.36		2.07	0.00	
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	
1991	1100	5.73	5.09	1.73	0.00	1.45	0.36	0.00	0.00	0.00		1.00	0.00	
1992	293	0.34	3.08	1.37	0.00	0.00	0.00	0.00	0.00	0.00		10.92	0.00	
1993	332	14.75	1.51	1.20	0.00	0.00	0.00	0.30	0.00	0.30		5.12	0.00	
1994	276	0.00	6.51	6.51	0.00	133.86	0.36	0.72	0.00	0.36		2.53	0.00	
Newsome Cr(@mouth)														
1986	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1987	1015	16.76	4.73	0.00	0.00	0.10	0.00	0.10	0.00	0.00		1.18	0.00	
1988	745	0.00	3.22	0.94	0.00	14.24	0.13	0.13	0.00	0.00		0.27	0.00	
1989	1029	7.48	3.69	0.19	0.00	3.50	0.29	0.19	0.00	0.00		0.39	0.00	
1990	871	6.20	2.99	0.92	0.00	5.86	1.61	0.11	0.00	0.11		0.69	0.00	
1991	621	0.00	21.99	3.39	0.00	2.10	0.65	0.00	0.00	0.00		2.58	0.00	
1992	400	0.25	6.50	1.25	0.00	0.00	0.00	0.00	0.00	0.00		1.00	0.00	
1993	659	9.56	2.28	1.82	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	
1994	466	2.15	3.86	0.21	0.00	45.07	0.00	0.21	0.00	0.00		0.21	0.00	
Red River(Strata 1,control I)														
1986	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1987	350	0.00	0.00	0.00	0.00	89.14	4.86	0.00	0.00	0.29		15.14	0.57	
1988	440	0.00	0.23	0.00	0.00	17.73	0.23	0.00	0.00	0.00		1.82	0.68	
1989	278	1.80	0.00	0.00	0.00	47.05	0.00	0.00	0.00	0.00		1.80	2.87	
1990	330	1.82	0.00	0.30	0.00	55.45	2.73	0.00	0.00	1.52		3.64	0.91	
1991	354	0.57	0.00	0.00	0.00	15.83	2.54	0.00	0.00	0.00		3.95	0.56	
1992	548	1.83	1.10	0.00	0.00	2.56	0.91	1.46	0.00	0.00		6.75	8.40	
1993	480	0.21	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00		1.46	1.25	
1994	266	0.00	0.00	0.00	0.00	78.45	0.75	1.13	0.00	0.00		3.01	3.00	

Stream	Area (m sq)	Steelhead Trout	Chinook Salmon	Cutthroat Trout	Bull Trout	Mountain Brook	Whitefish trout	Comments				
	Age 0	Age 1	Age 2	Age >2	Age 0	Age 1	<12 in	>12 in				
Red River(Strata 7,control2)												
1986	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1987	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1988	382	0.26	0.00	1.57	0.00	27.25	0.00	1.31	0.00	0.00	4.45	0.00
1989	538	0.37	1.49	0.74	0.00	16.72	0.93	0.00	0.00	0.00	2.04	0.19
1990	346	2.02	0.00	0.29	1.73	3.76	2.31	0.00	0.00	0.00	2.60	0.00
1991	419	0.00	0.48	0.00	0.00	0.48	0.00	0.48	0.24	0.00	1.67	0.95
1992	358	0.00	0.00	1.40	0.00	0.00	0.00	1.12	0.00	0.00	8.94	9.77
1993	377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.38
1994	315	0.00	0.64	0.32	0.00	5.09	0.00	0.63	0.00	0.00	1.27	3.50
Red River(Strata2,control2)												
1986	1032	0.10	1.16	0.10	0.00	4.07	0.00	0.29	0.00	0.19	0.68	0.00
1987	848	0.12	1.06	0.47	0.12	16.51	0.12	0.35	0.00	0.00	0.94	0.00
1988	880	0.00	1.36	0.23	0.11	4.43	0.11	0.80	0.00	0.00	1.25	0.00
1989	874	0.00	0.92	0.34	0.34	3.78	0.00	0.00	0.00	0.00	1.83	0.00
1990	846	0.00	0.47	0.12	0.12	0.00	0.24	0.12	0.00	0.00	0.71	0.00
1991	888	0.11	0.00	0.11	0.00	0.00	0.11	3.04	0.00	0.00	1.13	0.00
1992	837	0.00	1.91	0.72	0.00	4.30	0.00	0.36	0.00	0.00	0.72	0.00
1993	861	0.00	0.58	0.58	0.00	0.00	0.00	0.35	0.00	0.00	1.63	0.23
1994	818	0.12	0.00	0.00	0.00	0.48	0.00	0.24	0.00	0.00	0.48	0.12
Red River(Strata 2,treatment2)												
1986	952	0.00	1.89	0.21	0.11	19.33	0.00	0.11	0.00	0.00	2.94	0.00
1987	1128	1.24	1.60	1.33	0.09	47.96	0.71	0.44	0.00	0.18	2.84	0.00
1988	1188	0.00	0.42	0.59	0.08	22.81	1.09	0.25	0.08	0.17	2.53	0.00
1989	1040	0.87	0.87	0.10	0.00	4.81	0.67	0.87	0.00	0.00	1.35	0.00
1990	932	0.00	1.39	1.39	0.21	0.97	0.21	0.75	0.11	0.00	1.61	0.32
1991	1098	0.46	1.18	0.09	0.09	1.09	0.00	1.82	0.09	0.00	0.55	0.46
1992	1041	0.10	1.35	0.67	0.38	7.11	0.00	1.44	0.19	0.00	2.79	0.10
1993	919	0.00	0.44	1.52	0.54	0.00	0.33	0.76	0.00	0.00	1.09	0.33
1994	965	0.00	0.62	0.00	0.00	16.06	0.00	0.31	0.00	0.00	0.10	0.31
Red River(Strata4,control2)												
1986	1989	0.25	3.22	0.30	0.00	34.29	0.00	0.00	0.00	0.05	2.71	0.05
1987	2054	11.25	2.63	1.80	0.10	46.64	4.58	0.00	0.00	0.05	1.99	0.15
1988	2154	0.42	1.76	0.46	0.00	45.86	0.14	0.23	0.00	0.00	1.53	0.14
1989	2135	0.09	1.78	0.47	0.00	23.98	0.14	0.00	0.00	0.00	0.89	0.19
1990	2352	0.72	0.55	0.30	0.13	29.30	0.51	0.00	0.00	0.09	1.32	0.00
1991	2462	0.04	0.08	0.08	0.04	6.05	0.00	0.85	0.00	0.00	0.73	0.04
1992	2144	0.00	1.07	0.14	0.00	14.92	0.05	0.14	0.00	0.00	2.38	0.09
1993	2245	0.00	0.04	0.00	0.00	2.23	0.04	0.00	0.00	0.00	1.11	0.00
1994	175	0.00	0.00	0.00	0.00	33.09	0.00	0.00	0.00	0.00	0.57	0.57 Sub-sampled

Appendix A-5 (Con't). Summary of snorkeling observations (fish/100 m_{sq}) in the South Fork Clearwater River drainage, 1985-94. Verified from General Parr Monitoring Databas

Stream	Area (m _{sq})	Steelhead Trout Age 0 Age 1 Age 2 Age >2	Chinook Salmon Age 0 Age 1 <12 in >12 in	Cutthroat Trout	Bull Trout	Mountain Brook Whitefish trout	Comments
Red River(Strata4,treatment2)							
1986	2620	0.15	1.34	0.27	0.00	39.66	0.00
1987	2554	16.99	1.72	1.45	0.12	42.22	1.92
1988	2772	1.12	0.79	0.22	0.00	63.67	0.51
1989	3111	1.25	1.22	0.42	0.03	36.97	0.06
1990	2761	0.22	0.22	0.11	0.00	34.01	0.58
1991	2679	0.45	0.30	0.19	0.04	13.14	0.11
1992	2586	0.08	0.46	0.08	0.00	8.51	0.00
1993	2638	0.00	0.00	0.04	0.00	1.82	0.04
1994	196	0.00	0.00	0.00	0.00	76.39	0.00
Red River(Strata5,control2)							
1986	504	7.54	16.47	2.58	0.00	49.40	0.00
1987	658	1.22	7.30	0.61	0.00	11.86	0.00
1988	720	7.36	0.28	0.00	0.14	19.58	0.42
1989	712	0.56	0.84	0.28	0.00	1.55	0.56
1990	962	0.52	0.52	0.10	0.00	0.00	0.10
1991	762	0.39	0.00	0.13	0.00	1.18	0.00
1992	808	0.00	0.00	0.00	0.00	0.00	0.00
1993	1101	0.00	0.00	0.00	0.00	0.00	0.09
1994	754	0.00	0.27	0.13	0.00	11.54	0.00
Red River(Strata5,treatment2)							
1986	1001	1.60	10.89	0.50	0.00	15.08	0.00
1987	1184	0.00	5.15	0.17	0.00	9.46	0.00
1988	1140	0.79	0.35	0.18	0.00	3.25	0.00
1989	1187	0.17	1.35	0.08	0.00	1.35	0.25
1990	1063	0.85	0.09	0.75	0.00	1.22	0.19
1991	2089	0.05	0.10	0.00	0.00	0.53	0.00
1992	2864	0.00	0.00	0.00	0.00	0.00	0.00
1993	2236	0.00	0.00	0.00	0.00	0.00	0.00
1994	692	0.29	0.00	0.00	0.00	4.77	0.00
Ten Mile Creek(#1,lower)							
1985	643	6.07	1.71	4.35	0.16	0.00	0.00
1986	643	1.87	2.49	0.78	0.47	35.30	0.00
1987	688	2.03	0.58	1.31	0.58	0.15	0.00
1988	NA	NA	NA	NA	NA	NA	NA
1989	NA	NA	NA	NA	NA	NA	NA
1990	NA	NA	NA	NA	NA	NA	NA
1991	NA	NA	NA	NA	NA	NA	NA
1992	264	0.00	3.41	0.38	0.00	0.00	0.00
1993	282	1.42	2.48	0.35	0.00	0.00	0.00
1994	388	1.80	1.29	1.29	0.00	0.00	0.00
Ten Mile Creek(#2,upper)							
1992	247	0.00	6.08	7.70	0.00	0.00	0.00
1993	301	0.66	3.99	0.33	0.00	0.00	0.00
1994	458	2.18	3.05	0.44	0.00	0.00	0.22

Appendix A-6. Summary of snorkeling observations (fish/100 m sq) in the Snake River drainage, 1985-94. Verified from General Parr Monitoring Database.

Stream	Area (m sq)	Steelhead Trout Age 0 Age 1 Age 2 Age >2	Chinook Salmon Age 0 Age 1 <12 in >12 in	Cutthroat Trout	Bull Trout	Mountain Trout	Whitefish	Brook Trout	Comments
Captain John Crk (#1 ,lower)									
1985	291	5.50	7.56	3.09	0.34	0.00	0.00	0.00	0.00 Not verified
1986	293	29.21	20.96	2.41	0.00	0.00	4.12	0.00	0.00
1987	320	18.12	10.31	0.94	0.00	0.00	0.00	0.00	0.00
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	320	13.12	1.56	0.00	0.00	0.00	0.00	0.00	0.00
1990	320	7.19	11.25	0.00	0.00	0.00	0.00	0.00	0.00
1991	176	0.00	13.61	2.27	0.00	0.00	0.00	0.00	0.00
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993*	104	10.60	10.60	3.89	0.00	0.00	0.00	0.00	0.00
1994*									
Captain John Crk (#2,upper)									
1985	180	11.67	10.56	5.00	0.00	0.00	0.00	0.00	0.00 Not verified
1986	180	17.78	23.89	5.56	0.56	0.00	0.00	0.00	0.00
1987	180	15.00	10.00	7.00	1.67	0.00	0.00	0.00	0.00
1988	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	180	24.96	3.88	1.11	0.00	0.00	0.00	0.00	0.00
1990	180	7.21	7.21	0.55	0.00	0.00	0.00	0.00	0.00
1991	178	0.56	2.24	5.05	1.12	0.00	0.00	0.00	0.00
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993*	69	28.74	5.75	0.00	0.00	0.00	0.00	0.00	Not verified
1994*									
Granite Crk (#1 ,lower)									
1985	191	12.57	16.75	2.62	0.00	0.00	0.00	0.00	0.00 Not verified
1986	192	3.66	8.38	5.76	1.04	0.00	0.00	0.00	0.00
1987	230	13.91	5.65	5.65	1.30	0.00	0.00	0.00	0.00
1988	230	16.09	17.83	6.96	0.00	0.00	0.00	0.00	0.00
1989	461	6.95	7.16	4.78	0.22	0.00	0.00	0.00	0.00
1990	362	12.99	6.91	5.53	0.00	0.00	0.00	0.00	0.00
1991	315	3.17	10.79	2.86	3.17	0.00	0.00	0.32	0.00
1992	406	3.20	4.44	3.94	0.99	0.00	0.00	0.00	0.00
1993	876	0.91	2.62	2.97	0.91	0.00	0.00	0.00	0.00
1994	286	21.69	5.95	6.65	2.45	2.45	0.00	0.70	0.00
Granite Crk (#2,middle)									
1985	192	7.30	18.24	4.17	0.00	0.00	0.00	0.00	0.00 Not verified
1986	146	11.03	8.28	1.38	0.00	0.00	0.00	0.00	0.00
1987	184	13.59	4.89	3.26	0.54	0.00	0.00	0.00	0.00
1988	184	15.22	11.41	4.35	0.43	0.00	0.00	0.00	0.00
1989	233	6.00	10.29	3.86	0.00	0.00	0.00	0.00	0.00
1990	180	11.65	6.66	6.10	0.56	0.00	0.00	0.00	0.00
1991	260	4.62	6.15	1.15	0.00	0.00	0.38	0.38	0.00
1992	182	2.74	9.87	7.68	1.10	0.00	0.00	0.00	0.00
1993	211	0.00	5.68	1.42	0.95	0.00	0.00	0.00	0.00
1994	171	10.53	2.92	4.09	0.58	4.03 ⁴	0.00	0.00	0.00

*Electrofishing

Stream	Area (m sq)	Steelhead Trout Age 0 Age 1 Age 2 Age >2	Chinook Salmon Age 0 Age 1 <12 in >12 in	Cutthroat Trout	Bull Trout	Mountain Trout	Whitefish	Brook trout	Comments
Granite Crk (#3,upper)									
1985	200	7.50	6.50	6.00	1.50	0.00	0.00	0.00	0 Not verified
1986	200	5.50	14.50	9.50	7.50	0.00	0.00	0.50	0.00
1987	200	0.00	4.50	3.50	5.00	0.00	0.00	0.00	1.00
1988	200	2.00	19.00	17.00	1.00	0.00	0.00	0.00	0.00
1989	578	0.35	6.58	1.73	0.00	0.00	0.00	0.00	0.17
1990	551	2.36	7.44	2.36	0.18	0.00	0.00	0.00	0.54
1991	560	0.00	1.07	1.25	0.18	0.00	0.00	0.00	0.00
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	300	0.00	8.34	3.34	1.33	0.00	0.00	0.00	0.33
1994	370	2.97	5.40	4.05	1.08	0.00	0.00	0.27	0.00
Sheep Crk (lower)									
1985	122	13.93	5.74	15.57	3.28	0.00	0.00	0.00	0.00
1986	122	7.38	14.75	17.21	5.74	0.00	0.00	0.00	0.00
1987	313	11.51	5.12	6.39	4.47	0.00	0.32	0.00	0.32
1988	120	20.83	15.83	6.67	0.83	0.00	0.00	0.00	0.00
1989	256	12.50	7.81	8.20	0.78	0.00	0.00	0.00	0.00
1990	204	5.87	4.41	1.96	0.49	0.00	0.00	0.00	0.00
1991	215	13.95	13.02	4.65	0.47	0.00	0.00	0.00	0.47
1992	241	8.71	14.11	8.71	2.07	0.00	0.00	0.41	0.00
1993	222	2.25	15.03	9.90	3.60	0.00	0.00	0.00	0.00
1994	192	15.60	8.84	10.92	2.08	8.84	0.00	0.00	0.00
Sheep Crk (#2,upper)									
1985	468	3.63	3.85	2.78	0.43	0.00	0.00	0.00	0.00
1986	468	2.99	4.91	2.78	1.07	0.00	0.00	0.00	0.64
1987	546	1.28	3.66	0.92	0.18	0.00	0.00	0.00	0.37
1988	470	7.66	4.04	2.55	1.06	0.00	0.00	0.00	0.00
1989	438	7.31	4.34	5.03	0.68	0.00	0.00	0.00	0.23
1990	495	5.25	2.42	0.81	0.40	0.00	0.00	0.00	0.00
1991	480	8.33	5.42	1.67	0.00	0.00	0.00	0.00	0.00
1992	190	7.37	24.74	7.37	2.10	0.00	0.00	0.00	0.00
1993	260	1.54	10.77	4.61	2.31	0.00	0.00	0.00	0.00
1994	215	16.74	4.18	4.18	0.93	3.25	0.00	0.00	0.47
Wolf Creek, 1985-1991. Later years too polluted to snorkel.									
1985	342	34.80	9.65	7.89	2.05	0.00	0.00	0.00	0.00
1986	135	99.44	7.78	1.11	0.00	0.00	0.00	0.00	0.00
1987	428	18.24	3.27	1.87	0.00	0.00	0.00	0.00	0.00
1988	180	0.00	5.56	0.00	0.00	0.00	0.00	0.00	0.00
1989	160	5.62	11.25	0.00	0.00	0.00	0.00	0.00	0.00
1990	164	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00
1991	173	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B.

BULL TROUT AND RESIDENT FISH POPULATIONS IN THE NEWSOME CREEK DRAINAGE

ABSTRACT

A search for bull trout *Salvelinus confluentus* and documentation of respective fish populations and aquatic habitat was conducted in the Newsome Creek drainage in the summer of 1994. Seven tributaries of Newsome Creek were surveyed from July 5 through August 25, 1994. Bull trout were found in three of the seven tributaries with very low densities in all transects. Westslope cutthroat trout *Oncorhynchus clarki lewisi* were the most numerous fish present in the Newsome Creek drainage. Juvenile chinook salmon *O. tshawytscha* and steelhead/rainbow *O. mykiss* were found commonly throughout, but only in the lower reaches of most of the tributaries. None of the stream substrate attributes we measured were found to have any direct correlation with fish populations.

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INTRODUCTION

Recent declines in distribution and abundance of bull trout *Salvelinus confluentus* have prompted state and federal agencies to propose and administer management plans to protect this native char, and the critical habitats that correspond to its different life stages. This, in itself, has proven to be very difficult because bull trout populations have exceedingly different complexity and variation involving migration, spawning, and rearing, and not all areas are prone to the same disturbances and threats. This requires that managers and biologists understand the life history strategies of bull trout within their own management areas, and protect critical habitat areas from detrimental human disturbances.

Little is known of the life history of bull trout in the South Fork Clearwater River drainage (SFCLW). The Idaho Department of Fish and Game (IDFG), U.S. Forest Service (USFS), and the Bureau of Land Management (BLM) are co-sponsoring a project to better understand the populations of bull trout in this watershed. The purposes of this project are to: 1) describe basic life history of bull trout in SFCLW; 2) describe temporary and spatial distribution of bull trout in SFCLW; and 3) determine factors limiting bull trout in SFCLW.

Upon examining summaries from the 1993 snorkel surveys in the SFCLW (Schriever 1993), it was decided that emphasis in the 1994 field season would be placed on learning about the bull trout status in the Newsome Creek drainage.

The project to be undertaken entailed two phases: 1) trapping and tagging bull trout migrating into and out of the Newsome Creek drainage, and 2) a general search for bull trout in the drainage's upper tributaries and headwaters to identify spawning and rearing habitat for these fish.

This report evaluates the status of bull trout in the Newsome Creek drainage pertaining to their relative abundance, distribution, and migrational movements.

Study Area

Newsome Creek is a major tributary to the South Fork Clearwater River and is located within the Elk City Ranger District in the Nez Perce National Forest. This watershed is composed of Douglas fir, lodgepole pine, western larch, and other conifers typical of forested mountain regions of central Idaho. The entire Newsome Creek watershed drains an area of approximately 17,212 hectares.

We worked on seven tributaries within the Newsome Creek drainage; West Fork Newsome Creek (1,348 ha), Pilot Creek (1,588 ha), Baldy Creek (1,556 ha), Bear Creek (1,119 ha), Sing Lee Creek (624 ha), Upper Newsome Creek (2,542 ha), and Haysfork Creek (1,260 ha). We sampled within the entire snorkelable lengths of all these creeks, except Sing Lee Creek.

Historically, the Newsome Creek drainage has been dredged extensively for gold, especially in the mainstem of Newsome Creek and the first few kilometers of many of the tributaries. The watershed has also been heavily logged with numerous clear-cuts throughout. Logging and recreational dredging are still being practiced in the area.

Historically, fish populations in the Newsome Creek drainage included: bull trout, rainbow/steelhead *O. mykiss*, chinook salmon *O. tshawytscha*, westslope cutthroat trout *O. clarki lewisi*, mountain whitefish *Prosopium williamsoni*, sculpin *Cottus spp.*, dace *Rhinichthys spp.*, and sucker *Catostomus spp.*

MATERIALS AND METHODS

The upstream trap was located at the lower reaches of Newsome Creek at the 3-mile road marker. This trap covered the entire width of the stream and was put in from early June until the second week of October. This trap documented fluvial adult bull trout migrating up the drainage to spawn or feed.

The downstream weir was placed just above the upstream trap and covered 60% of the width of the creek. This trap caught juvenile bull trout emigrating downstream or adults returning to the SFCLW from spawning or feeding. The downstream weir was placed in Newsome Creek at the beginning of August until the second week of October.

All fish captured were scanned for PIT tags and checked for polymer marks from 1993. All other bull trout over 180 mm, were PIT-tagged, polymer-marked (left pectoral/orange), and scale sampled, with length, weight, and sex noted. General numbers and data on all other resident fish species were taken. Daily measurements of water temperature (A.M. and P.M.), water level, water clarity, and water conditions were also recorded.

A snorkeling crew sampled the upper tributaries for bull trout, and documented the stream community composition of all species and habitat substrate present. Snorkeling was conducted both day and night to compare species enumeration and capture success of bull trout as was documented in the 1993 field season (Schriever 1993). When snorkeling, special attention was devoted to looking for external polymer marks on any bull trout, with location, date, size, polymer color, and fin mark recorded. It is hoped that snorkeling in conjunction with weir traps will better describe if the fish in this population are fluvial or resident.

We used a stratified random sampling method to document species composition and habitat classification for all seven tributaries in this study. This method consisted of partitioning the entire length of each individual tributary into 1 km sections, and then sampling two randomly selected 100 m transects within each kilometer section. Transects within each kilometer were selected by drawing two playing cards from a 10-card deck. The cards were labeled 1 through 10 with the two numbers drawn representing the two 100 m transects within each kilometer. For example, if a 2

and a 5 were drawn, they represented the 100-200 m and 400-500 m transects to be sampled in that particular kilometer.

We established transects by pacing an entire creek from its confluence to its headwaters, a fish barrier, or a fork in the creek that significantly reduced the water flow, inhibiting successful snorkel censusing. We chose pacing for setting up the transects due to the unevenness of terrain and usually cumbersome loads that we had to carry.

We snorkeled each transect to determine fish numbers and species, using methods described by Thurow (1994). We used one snorkeler for each transect due to the size and depth of these creeks. We used a writing cuff made of 20 cm diameter PVC pipe to record fish by species and size class in the water. Actual length of each transect was determined by habitat, water temperatures, snorkeler's endurance, and acceptance that a significant representative sample of habitat types (pools, riffles, and runs) had been achieved.

We randomly snorkeled one transect at night for every four transects day-snorkeled; one nighttime snorkel for every 2 km section of creek. This was done for direct enumeration comparisons between snorkel sampling in daytime versus nighttime, and with the intention of capturing and PIT tagging bull trout. When we snorkeled at night, we carried an underwater light and a 40 cm net to aid in capturing bull trout. All snorkeling was done in July and August, 1994.

When snorkeling at night, captured bull trout over 15 cm were anesthetized with MS-222 (tricaine methanosulphate), PIT-tagged, and fin-tagged with a fluorescent polymer dye. The MS-222 was used in a 15 g/l solution, decreased or increased depending on water temperature. Any bull trout captured and tagged was placed in a perforated holding container and placed in the stream for overnight observation. The bull trout were PIT-tagged in the mid-abdomen, in front of the pelvic fin. The needle was pointed posteriorly and injected the tag towards the pelvic fins. The needles and tags were sterilized in 70% ethanol and rinsed in distilled water before each use. Our polymer dye was fluorescent red and we injected it into the first ray of the dorsal fin. The polymer dye is being tested as a research and management tool to test observability, without recapture or handling fish when snorkeling. The dye will supposedly last for the life of the fish, and different populations can be tagged in a multitude of different fin rays, colors, and combinations to easily discern migratory and feeding patterns of individuals and populations within a watershed. We were using dye to hopefully observe fish tagged with the polymer at a later date while snorkeling, or, if they were moving downstream, at the Newsome Creek weir. To document fish moving into the drainage, fish tagged moving upstream at the Newsome Creek weir were injected with a yellow polymer dye on the left pectoral fin. This was done with the expectation of observing and identifying these fish while doing a snorkel survey.

We classified substrate in each transect by particle size using a modified version of the method developed by Platts et al. (1983). We took at least four cross-sectional habitat measurements within each transect. These cross-sectional measurements were taken perpendicular to stream flow and consisted of a complete width, width depth, and substrate percentages every 0.5 m from the left bank to the right bank. Depth and substrate percentages started 0.5 m off the

water's edge on the left bank, and continued every 0.5 m until running out of water on the right bank. We used eight substrate categories (silt, sand, gravel, cobble, rubble, boulder, woody debris, and vegetation) to perform a habitat percentage assessment at every 0.5 m in the cross-sections. The substrate was determined by ocular estimates of particle size (Table 1) and percentage of each substrate was determined by using a 30 cm by 30 cm plexiglass viewing box divided into ten sections. By summing what we observed in the 10 sections, we obtained a percentage estimate of substrate composition at every half-meter cross-section. Woody debris represented any downfall or dead wood, and vegetation was any living green plant, including algae. We used a 50 m measuring tape for measuring the lengths of transects and width of cross-sectional measurements. A measuring stick, in decimeters, was used for obtaining depth at every 0.5 m interval. Water temperature, date, and time was recorded before every snorkeling event.

The observed fish numbers and density (per 100 m²) tables were all obtained from the numbers of fish observed in each transect, divided by the creek area (m²) obtained by multiplying length and mean width, from at least four cross-sectional measurements. Approximate elevations of transects were taken from topographic maps.

RESULTS

Newsome Creek Tributaries

Westslope cutthroat trout made up 57.2% of all fish documented in the Newsome Creek tributaries (Table 2). They were found in almost every transect in all tributaries sampled. The most frequent size class observed were fish in the 7.5 to 10 cm range (Table 2). The largest cutthroat trout we observed were in the 30 to 32.5 cm class.

Chinook salmon were second in abundance throughout Newsome Creek drainage being 39.1% of all fish documented. Most chinook salmon in these tributaries were concentrated in the confluence of the respective tributary to about the first few kilometers up the tributary. They usually stayed in the lower 1/3 of the tributaries. All fish observed were age class 0 fish with most being in the 5 to 7.5 cm length range.

Steelhead/rainbow trout made up 6.0% of all fish documented in the Newsome Creek drainage. They, like the chinook salmon, were usually found in the lower reaches of the tributaries towards the confluence of the tributary with the mainstem of Newsome Creek. Most steelhead/rainbow trout were in the 7 to 10.5 cm size class.

Except for the lone bull trout observed in Bear Creek, all other bull trout were observed in Pilot and Baldy creeks (Table 3). They made up 0.9% of all fish observed in the Newsome Creek drainage. The most frequently observed bull trout were individuals in the 20 to 22.5 cm category.

Table 1. Classification of stream substrate channel materials by particle size (modified from Platts et al., 1983).

Sediment classification	Particle diameter (mm)
Boulder	305.0 or more
Rubble	152.2 to 304.0
Cobble	76.1 to 151.0
Gravel	4.81 to 76.0
Sand	0.83 to 4.71
Silt	0.83 or less

Table 2. Length frequencies of all fish observed day-snorkeling in Newsome Creek drainage (seven tributaries), 1994.

mm	Steelhead trout	Cutthroat trout	Chinook salmon	Bull Trout	Sculpin
<50	2	266	123	0	10
50	12	163	696	0	24
75	57	346	292	4	31
100	53	248	1	1	12
125	24	181	0	4	0
150	9	118	0	0	0
175	9	61	0	6	0
200	2	24	0	7	0
225	0	18	0	1	0
250	1	14	0	1	0
275	2	8	0	0	0
300	1	9	0	1	0
325	0	0	0	0	0
350	0	0	0	0	0
375	0	0	0	0	0
400	0	0	0	0	0
425	0	0	0	0	0
450	0	0	0	1	0
475	0	0	0	0	0
Totals	172	1,456	1,112	26	77

Table 3. Summary of bull trout in Newsome Creek drainage, 1994.

Creek	Total No. observed	Number (day)	Number (night)	Captured
Pilot Creek	19	18	1	1
Baldy Creek	11	7	4	2
Bear Creek	1	--	1	1
Total	31	25	6	4

Bull trout were primarily concentrated in the upper half of these creeks. The largest individual fish recorded was a bull trout, a 45 cm individual seen in Pilot Creek.

Sculpin made up 2.7% of the total fish documented. However, this number is most likely a very low representation of their population. Their size and secretive nature make them difficult to observe. They were much easier to see snorkeling at night because of the concentrated and focused viewing in the light, and the advantage of seeing their eye-shine. Most sculpin were in the 5 to 7.5 cm size class.

Habitat measurements, provided as mean ocular estimates of substrate, are listed in Appendix A.

West Fork Newsome Creek

We snorkeled 17 transects in the West Fork Newsome Creek (WFNC) during the day and repeated three transects doing night snorkels. We snorkeled an area of 3,984.7 m² in WFNC between July 5 and July 18, 1994. No bull trout were seen in the WFNC during either day or night snorkeling.

Westslope cutthroat trout made up 51% of all fish observed in WFNC (Table 4). They were found primarily in the upper 2/3 of WFNC, being absent from four of the first five transects, with none in the first kilometer. We found the concentrations of cutthroat were highest in transect 9.1 km. However, a small waterfall in 9.1 km seemed to be a fish barrier at this flow of water, and almost every one of the 39 fish were found in the large pool at the bottom of this fall. The size of these fish ranged from 5 to 30 cm in the WFNC, with the majority being in the 7.5 to 10 cm category. The density of cutthroat trout throughout the WFNC was 5.87 fish per 100 m² (Table 5).

Chinook salmon were the next most prevalent fish, at 28% of all fish counted in the WFNC. Chinook salmon were highly concentrated and found only in transect 1.1 (57.26/100 m²), which is the confluence of WFNC and Newsome Creek (Table 5). Nearly all were less than 5 cm in length (Table 4).

Steelhead/rainbow trout made up 20% of all fish seen in WFNC. They were found only in the first 8 transects, through the 4th kilometer of the creek. Steelhead/rainbow trout density was 4.44 fish per 100 m² with the highest density in transect 3.1 (7.85/100 m²) (Table 5). The most frequent size of steelhead trout encountered was the 10 to 12.5 cm size class (Table 4).

Sculpin made up the rest of the fish seen in WFNC. This number, as throughout the drainage, is significantly less than the true population, due to their size, cryptic coloration, and behavior, making them difficult to see and count.

Table 4. Length frequencies of all fish observed day-snorkeling in the West Fork Newsome Creek, July 1994. (No bull trout were observed.)

mm	Steelhead trout	Chinook salmon	Cutthroat trout	Sculpin
<50	2	115	1	0
50	5	12	23	2
75	18	1	51	6
100	30	0	47	1
125	14	0	38	0
150	6	0	39	0
175	9	0	9	0
200	2	0	9	0
225	0	0	6	0
250	1	0	6	0
275	2	0	0	0
300	<u>1</u>	<u>0</u>	<u>5</u>	<u>0</u>
TOTAL	90	128	234	9

Table 5. Observed fish densities (100 m²) in the West Fork Newsome Creek, July 1994. (Total fish, includes all fish in Table 4, no bull trout were observed)

Transect	River area (m ²)	Date	Temp (C)	Elev.	Total fish density	-----Cutthroat trout-----				Chinook Total (age class 0)	-----Steelhead trout-----			
						Total density	<10 cm	10-15 cm	>15 salmon cm		<10 density	10-15 cm	>15 cm	cm
1.1 km	223.6	7/5	10.0		62.18	0	0	0	0	57.26	4.92	3.58	1.34	0
1.9 km	253.8	7/5	10.0		2.76	0	0	0	0	0	2.76	1.58	1.18	0
1st km total	477.4	--	--	--	30.58	0	0	0	0	26.81	3.77	2.51	1.26	
2.7 km	350.8	7/6	10.0		4.56	2.85	0	0	2.85	0	4.28	0	2.57	1.71
2.8 km	306.9	7/6	10.0		5.86	0	0	0	0	0	4.59	1.63	2.60	0.33
2nd km total	657.7	--	--	--	5.17	1.52	0	0	1.52	0	4.41	0.76	2.58	1.06
3.1 km	292.8	7/7	11.0		8.88	0	0	0	0	0	7.85	2.05	4.44	1.37
3.9 km	243.9	7/8	12.5		9.43	4.92	2.05	2.05	0.82	0	9.43	0.41	4.10	0
3rd km total	536.7	--	--	--	9.13	2.24	0.93	0.93	0.37	0	8.64	1.30	4.29	0.75
4.2 km	296.8	7/8	15.0		5.39	5.05	1.68	3.37	0	0	0	0	0	0
4.5 km	282.5	7/8	15.0		12.03	8.50	2.12	2.07	2.12	0	2.48	0.35	1.42	0.71
4th km total	579.3	--	--	--	8.63	6.73	1.90	3.63	1.04	0	1.21	0.17	0.69	0.35
5.5 km	324.1	7/12	14.0		4.93	4.93	0.31	4.01	0.62	0	0	0	0	0
5.9 km	350.6	7/12	14.0		7.42	6.85	1.99	4.28	0.57	0	0	0	0	0
5th km total	674.7	--	--	--	6.28	5.93	1.78	4.15	0.59	0	0	0	0	0
6.1 km	293.0	7/13	13/0		8.53	8.19	4.09	3.41	0.68	0	0	0	0	0
6.2 km														
6th km total														
7.5 km	174.0	7/14	13.0		8.63	8.63	1.73	5.75	1.15	0	0	0	0	0
7.8 km	212.7	7/14	12.0		12.22	12.22	8.46	3.76	0	0	0	0	0	0
7th km total	386.7	--	--	--	10.60	10.60	5.43	4.65	0.29	0	0	0	0	0
8.2 km	200.9	7/18	13.0		11.95	11.95	3.98	5.97	1.99	0	0	0	0	0
8.5 km	95.8	7/18	13.5		14.61	14.61	5.21	8.35	1.04	0	0	0	0	0
8th km total	296.7	--	--	--	12.81	12.81	4.28	6.74	1.68	0	0	0	0	0
9.1 km	82.5	7/18	14.0		48.48	48.48	6.06	24.24	18.18	0	0	0	0	0
Totals	3,984.7	--	--		11.64	5.87	1.88	3.11	0.88	3.21	2.23	0.63	1.25	0.35

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The comparison of day versus night snorkeling on the WFNC (Table 6) showed more fish being seen during the day in two of the three transects. The differences in fish counted ranged from a maximum of 14% in transect 1.1 km to a minimum of 6% in transect 5.5 km.

Pilot Creek

We snorkeled 18 transects in Pilot Creek during the day and repeated four transects at night. Snorkeling was done in Pilot Creek from July 18 to July 29, 1994. We covered an area of 4,815.5 m² snorkeling in this creek.

Bull trout were found in the upper 2/3 of Pilot Creek, in 10 of the last 14 transects (Table 7). Bull trout only accounted for 2.0% of all fish observed in Pilot Creek. We saw more than two bull trout per transect only once. This was in transect 6.1 km (tributary), the first major tributary to Pilot Creek. This transect has a waterfall with a 3-m deep pool and contained 31 fish, 6 of these a small pool above the falls. This transect had the highest concentration of bull trout in Pilot being bull trout. Originally, we had assumed this was a fish barrier, but we saw a 40 cm bull trout in Creek with a density of 2.88 fish/100 m². The size of bull trout ranged from 7.5 to 40 cm with the most frequent size being in the 20 to 22.5 cm size class (Table 8). Density for bull trout was low throughout with only two transects having a density of one or more fish per 100 m². The density of bull trout throughout Pilot Creek was 0.39 fish/100 m². One bull trout was captured in Pilot Creek night snorkeling (Table 9). This 178 mm fish was PIT tagged, polymer marked, with a scale sample and weight documented.

Chinook salmon made up the majority of fish counted in Pilot Creek, at 67.1% of all fish. These fish were concentrated in the first third of Pilot Creek, in the first seven transects (Table 10). Through the first 4 km, chinook had an average density of 25.9 fish/100 m². Throughout Pilot Creek, they had a density of 12.77 fish /100 m². The highest concentration was in transect 2.2 km (95.58/100 m²) (Table 10), and most fish throughout Pilot Creek were 5 to 7.5 cm long (Table 8).

Cutthroat trout were found throughout Pilot Creek in every transect snorkeled. Cutthroat trout made up 21% of all fish seen in Pilot Creek. The highest concentration of cutthroat trout was in transect 6.1 km (tributary), with a density of 11.99 fish/100 m² (Table 10). Throughout Pilot Creek, the cutthroat trout density was 5.01 fish/100 m². The most frequently observed size class for cutthroat trout was the 12.5 to 15 cm range (Table 8).

Steelhead/rainbow trout made up 3.2% of all fish observed in Pilot Creek, and were found throughout the lower half of the creek. They were observed in seven of the first ten transects, with an average density of 0.99 fish/100 m² in these transects. This is compared to an average density of 0.60 fish/100 m² found throughout Pilot Creek. Transect 1.7 km held the highest density of steelhead trout in Pilot Creek (Table 10). The most frequent size class of steelhead trout in Pilot Creek was the 7.5 to 10 cm group (Table 8).

Table 6. Comparison of day versus night snorkeling on fish density counts (per 100 m²) in West Fork of Newsome Creek, July 1994.

Transect	Area (m ²)	Date	Chinook salmon		----Steelhead trout (100 m ²)----				--Cutthroat trout (100 m ²)--			
			Total fish (100 m ²)	(Age 0) (100 m ²)	Total	<10 cm	10-15 cm	>15 cm	Total	<10 cm	10-15 cm	>15 cm
1.1 km	223.6	Day - 7/5/94	62.18	57.26	4.92	3.58	1.34	0	0	0	0	0
		Night - 7/16/94	52.77	47.85	4.02	1.34	1.78	0.89	0	0	0	0
4.5 km	282.5	Day - 7/8/94	12.03	0	2.48	0.35	1.42	0.71	8.50	2.12	2.07	2.12
		Night - 7/12/94	13.45	0	0	0	0	0	12.39	3.16	5.66	4.60
5.5 km	324.1	Day - 7/12/94	4.93	0	0	0	0	0	4.93	0.31	4.01	0.62
		Night - 7/13/94	4.63	0	0	0	0	0	4.32	1.23	3.09	0

Table 7. Occurrence and density (per 100 m²) of bull trout in Pilot Creek, July 1994. (Total fish, includes all fish seen in Table 8.)

Transect	River area (m ²)	Date	Temp (C)	Elev.	Total fish	-----Bull trout-----			
						Total density	<10 cm	10-15 cm	>15 cm
1.5 km	299.8	7/15	16.5	3,960	29.68	0	0	0	0
1.7 km	257.5	7/15	16.0	3,960	57.09	0	0	0	0
1st km total	557.3	--	--	--	42.35	0	0	0	0
2.2 km	282.5	7/15	12.0	4,000	98.41	0	0	0	0
2.8 km	286.7	7/22	16.0	4,120	7.63	0	0	0	0
2nd km total	569.2	--	--	--	52.71	0	0	0	0
3.5 km	323.3	7/22	19.0	4,160	13.61	0	0	0	0
3.1 km	317.8	7/22	18.0	4,240	27.69	0.31	0	0	0.31
3rd km total	641.1	--	--	--	20.59	0.15	0	0	0.15
4.1 km	351.5	7/22	17.0	4,240	19.34	0	0	0	0
4.9 km	237.9	7/23	16.5	4,320	3.78	0	0	0	0
4th km total	589.4	--	--	--	13.06	0	0	0	0
5.3 km	255.6	7/23	16.0	4,360	3.13	0.39	0	0	0.39
5.4 km	318.3	7/23	16.0	4/360	5.66	0	0	0	0
5th km total	573.9	--	--	--	4.53	0.17	0	0	0.17
6.3 km	327.1	7.27	15.0	4,640	5.20	0.61	0	0	0.61
6.9 km	292.4	7/27	15.0	4,720	8.55	0.34	0	0	0.34
6th km total	619.4	--	--	--	6.78	0.48	0	0	0.48
Trib 6.1 DRR	208.5	7/27	13.0	4,600	14.87	2.88	0	0	2.88
7.5 km	172.9	7/28	15.0	4,800	6.36	0.58	0	0	0.58
7.9 km	213.5	7/28	15.0	4,800	6.55	0.94	0	0	0.94
7th km total	386.4	--	--	--	6.47	0.78	0	0	0.78
8.6 km	187.9	7/28	14.0	5,120	7.98	1.06	1.06	0	0
8.9 km	198.9	7/29	12.5	5,240	4.02	0	0	0	0
8th km total	386.8	--	--	--	5.95	0.52	0.52	0	0
9.4 (RF)	133.1	7/29	12.0	5,360	9.01	0	0	0	0
9.4 (LF)	149.4	7/29	13.0	5,360	6.02	0.67	0	0	0.67
9th km total	282.5	--	--	--	7.43	0.71	0	0	0.71
Totals	4,814.5	--	--	+1,320	18.96	0.39	0.04	0	0.35

Table 8. Length (total length) frequencies of all fish observed day-snorkeling in Pilot Creek, July 1994.

mm	Cutthroat trout	Steelhead trout	Bull trout	Chinook salmon	Sculpin
<50	0	0	0	8	0
50	17	0	0	472	3
75	35	16	2	130	5
100	40	9	0	0	0
125	54	2	0	0	0
150	40	2	0	0	0
175	26	0	6	0	0
200	12	0	7	0	0
225	7	0	1	0	0
250	4	0	1	0	0
275	3	0	0	0	0
300	2	0	1	0	0
325	0	0	0	0	0
Total	241	29	19	610	9

Table 9. Bull trout tagging records from fish captured night snorkeling in the Newsome Creek drainage, 1994.

Date	Length (mm)		Location (km)	PIT tag #	Polymer fin-color	Scale sample
	Total	Fork				
7/29	178	170	Pilot Creek, 7.5	7F7D0E3705	dorsal-red	yes
8/12	185	180	Bear Creek, 1.1	7F7D0E1C5F	dorsal-red	yes
8/26	158	152	Baldy Creek, 8.3	7F7D0F2634	dorsal-red	yes

Table 10. Observed fish densities (per 100 m²) in Pilot Creek, July 1994. (Total fish, includes all fish in Table 8.)

Transect	River area (m ²)	Date	Temp (C)	Elev.	Total fish	-----Cutthroat trout-----				Chinook Salmon (age class 0)	-----Steelhead-----			
						Total density	<10 cm	10-15 cm	>15 cm		Total density	<10 cm	10-15 cm	>15 cm
1.5 km	299.8	7/15	16.5	3,960	29.68	3.00	0.33	1.33	1.33	23.68	2.67	1.67	1.00	0
1.7 km	257.5	7/15	16.0	3,960	57.09	3.12	0	2.33	0.78	49.70	3.88	1.17	2.72	0
1st km total	557.3	--	--	--	42.35	3.05	0.18	1.79	1.08	35.71	3.23	1.44	1.79	0
2.2 km	282.5	7/15	12.0	4,000	98.41	1.77	0	1.06	0.71	95.58	0.70	0.70	0	0
2.8 km	286.7	7/22	16.0	4,120	7.63	6.28	2.09	3.49	0.70	0.35	1.05	0.70	0.35	0
2nd km total	569.2	--	--	--	52.71	4.04	1.05	2.28	0.70	47.61	0.88	0.70	0.17	0
3.5 km	323.3	7/22	19.0	4,160	13.61	8.04	3.40	4.02	0.62	4.95	0	0	0	0
3.1 km	317.8	7/22	18.0	4,240	27.69	4.71	1.26	1.57	1.89	21.08	0.63	0	0.63	0
3rd km total	641.1	--	--	--	20.59	6.39	2.34	2.81	1.25	12.95	0.31	0	0.31	0
4.1 km	351.5	7/22	17.0	4,240	19.34	2.28	0.85	1.42	0.28	16.22	0	0	0	0
4.9 km	237.9	7/23	16.5	4,320	3.78	2.94	1.26	0.84	0.84	0	0.84	0.84	0	0
4th km total	589.4	--	--	--	13.06	2.54	1.01	1.19	0.51	9.67	0.34	0.34	0	0
5.3 km	255.6	7/23	16.0	4,360	3.13	1.96	0	0.78	1.17	0	0.78	0.78	0	0
5.4 km	318.3	7/23	16.0	4,360	5.66	0.94	1.57	3.14	0	0	0	0	0	0
5th km total	573.9	--	--	--	4.53	4.01	0.52	1.22	2.27	0	0.35	0.35	0	0
6.3 km	327.1	7/27	15.0	4,640	5.20	4.59	0.61	2.45	1.53	0	0	0	0	0
6.9 km	292.4	7/27	15.0	4,720	8.55	8.21	2.39	4.10	1.71	0	0	0	0	0
6th km total	619.4	--	--	--	6.78	6.30	1.45	3.23	1.61	0	0	0	0	0
Trib 6.1 DRR	208.5	7/27	13.0	4,600	14.87	11.99	0	8.15	3.84	0	0	0	0	0
7.5 km	172.9	7/28	15.0	4,800	6.36	5.78	2.31	2.89	0.58	0	0	0	0	0
7.9 km	213.5	7/28	15.0	4,800	6.55	5.62	0.47	4.22	0.94	0	0	0	0	0
7th km total	386.4	--	--	--	6.47	5.69	1.29	3.62	0.78	0	0	0	0	0
8.6 km	187.9	7/28	14.0	5,120	7.98	6.92	1.06	5.32	0.53	0	0	0	0	0
8.9 km	198.9	7/29	12.5	5,240	4.02	4.02	0	3.52	0.50	0	0	0	0	0
8th km total	386.8	--	--	--	5.95	5.43	0.52	4.39	0.52	0	0	0	0	0
9.4 (RF)	133.1	7/29	12.0	5,360	9.01	6.01	3.00	2.25	0.75	0	0	0	0	0
9.4 (LF)	149.4	7/29	13.0	5,360	6.02	4.69	0.67	4.02	0	0	0	0	0	0
9th km total	282.5	--	--	--	7.43	5.31	1.77	3.19	0.35	0	0	0	0	0
Totals	4,814.5	--	--	+1,320	18.96	5.01	1.08	2.74	1.20	12.67	0.60	0.33	0.27	0

The comparison of day versus night snorkeling on Pilot Creek was noticeably erratic. Transect 1.5 km had an 86% decrease in density of fish from day to night snorkeling. This number is so different because it seems the chinook salmon disappeared a few days later. Transect 2.8 was identical between day and night snorkeling in density of fish observed. Both transects 5.4 and 7.5 had higher densities in favor of night snorkeling counts, being approximately 31% higher (Table 11).

Baldy Creek

We snorkeled 17 transects in Baldy Creek during the day, including four transects repeated for night snorkeling. We snorkeled Baldy Creek between July 23 to August 7, 1994. An area of 3,740.1 m² was snorkeled.

We found seven bull trout in Baldy Creek. They accounted for only 1.3% of all fish observed. Bull trout were found sporadically in the upper two-thirds of Baldy Creek. They were found in 6 of the last 12 transects from transect 3.3 km to 8.6 km. The highest density of bull trout was found in transect 7.6 km, with 1.58 fish/100 m² (Table 12). Only seven bull trout were seen in all of Baldy Creek, and the density of bull trout throughout the creek was 0.19 fish/100 m². All bull trout observed were less than 15 cm long. During night snorkeling, four bull trout were observed in transects 6.1 km and 8.6 km, with two bull trout being captured in transect 8.6 km. One of these bull trout was large enough to PIT tag and polymer mark (Table 9). The other bull trout was about 6 cm long and was released.

Westslope cutthroat trout made up 49% of the entire number of fish observed in Baldy Creek. They were observed in every transect in Baldy Creek, and had an average density of 6.95 fish/100 m² throughout the creek (Table 13). The highest densities of cutthroat trout were found in the 5th and 6th kilometers, with transect 5.10 km having the highest at 11.78 fish/100 m². The most frequently observed size class of cutthroat trout was the 7.5 to 10 cm group (Table 14).

Chinook salmon were the second most abundant fish in Baldy Creek at 40% of the entire census. Chinook salmon were found in the lower third of Baldy Creek in seven of the first eight transects. The highest density was found in the first transect 1.5 km at 60.73 fish/100 m². For the first eight transects, they had a density of 9.67 fish/100 m², compared to 5.70 fish/100 m² for throughout the creek (Table 13). Most chinook salmon were in the 5 to 7.5 cm size category (Table 14).

Steelhead/rainbow trout made up 5.2% of all fish observed in Baldy Creek. All but one fish were found in the lower half of Baldy Creek, in seven of the first eight transects. The highest density of steelhead/rainbow trout was found in transect 1.5 km at 2.57 fish/100 m². The density of steelhead/rainbow trout in the first half of Baldy Creek is 1.2 fish/100 m², compared to 0.75 fish/100 m² throughout the creek (Table 13). The most common size of steelhead trout observed was about 10 to 12.5 cm long (Table 14).

Table 11. Comparison of day vs. night snorkeling on fish densities (per 100 m²) in Pilot Creek, July 1994.

Transect	River area (m ²)	Snorkel survey	Date	Total fish	-----Cutthroat trout-----				Chinook salmon (age 0)	-----Steelhead trout-----				-----Bull trout-----			
					Total	cm	<10 cm	10-15 cm		>15 cm	Total	cm	<10 cm	10-15 cm	>15 cm	Total	cm
1.5	299.8	Day	7/15	29.68	3.00	0.33	1.33	1.33	23.68	2.67	1.67	1.00	0	0	0	0	0
		Night	7/21	4.00	0.67	0.67	0.33	0	2.33	0	0	0	0	0	0	0	0
2.8	286.7	Day	7/15	7.63	6.28	2.09	3.49	0.70	0.35	1.05	0.90	0.35	0	0	0	0	0
		Night	7/24	7.63	5.58	1.39	1.74	2.44	0.35	1.05	0.35	0.70	0	0	0	0	0
5.4	318.3	Day	7/23	5.66	5.66	0.94	1.57	3.14	0	0	0	0	0	0	0	0	0
		Night	7/23	8.17	8.17	3.14	4.71	0.31	0	0	0	0	0	0	0	0	0
7.5	172.9	Day	7/28	6.36	5.78	2.31	2.89	0.58	0	0	0	0	0	0.58	0	0	0.58
		Night	7/28	9.25	8.68	0.58	7.52	0.58	0	0	0	0	0	0.58	0	0	0.58

Table 12. Occurrence and density (100 m²) of bull trout in Baldy Creek, July and August, 1994. (Total fish, includes all fish seen in Table 14.)

River 15>15Transect	area (m ²)	Date	Temp (C)	Elev.	Total fish	-----Bull trout-----			
						Total density	<10 cm	10- cm	cm
1.5 km	233.8	7/23	18.0	4,040	65.87	0	0	0	0
1.7 km	249.2	7/24	18.0	4,040	28.90	0	0	0	0
1st km total	483.0	--	--	--	46.79	0	0	0	0
2.1 km	299.0	7/24	18.0	4,080	12.04	0	0	0	0
2.(10) km	269.2	7/24	18.0	4,160	12.26	0	0	0	0
2nd km total	568.2	--	--	--	12.14	0	0	0	0
3.3 km	280.6	8/3	18.5	4,160	8.91	0.36	0	0.36	0
3.7 km	308.4	8/3	18.0	4,200	5.51	0	0	0	0
3rd km total	589.0	--	--	--	7.13	0.17	0	0.17	0
4.1 km	254.6	8/3	17.0	4,240	8.64	0	0	0	0
4.9 km	308.3	8/3	16.5	4,320	6.81	0	0	0	0
4th km total	562.9	--	--	--	7.64	0	0	0	0
5.8 km	161.8	8/3	15.5	4,360	11.12	0	0	0	0
5.(10) km	195.2	8/4	15.0	4,440	12.30	0	0	0	0
5th km total	357.0	--	--	--	11.76	0	0	0	0
6.1 km	173.5	8/4	15.0	4,440	11.53	0.58	0	0.58	0
6.8 km	227.8	8/4	15.5	4,600	10.97	0.88	0	0.88	0
6th km total	401.3	--	--	--	11.21	0.75	0	0.75	0
7.1 km	218.1	8/4	15.5	4,680	12.38	0	0	0	0
7.6 km	126.9	8/6	13.0	4,720	8.67	1.58	0.79	0.79	0
7th km total	345.0	--	--	--	11.01	0.58	0.29	0.29	0
8.4 km	139.5	8/6	14.0	4,840	9.32	0	0	0	0
8.6 km	120.9	8/6	14.0	5,000	9.10	0.83	0.83	0	0
8th km total	260.4	--	--	--	9.22	0.38	0.38	0	0
9.3 km	173.3	8/7	14.0	5,200	5.19	0	0	0	0
Total	3,740.1	--	--	+1,160	14.38	0.19	0.05	0.13	0

Table 13. Observed fish densities (per 100 m²) in Baldy Creek, July-August, 1994. (Total fish, includes all fish in Table 14.)

	River		Total	<10	10-15	>15	-----Cutthroat trout-----				Chinook Total	<10	-----Steelhead trout-----				Date	Temp
							salmon						Transect	area (m²)				
205	1.5 km	233.8	7/23	18.0	4,040	65.87	2.57	0	2.57	0	60.73	2.57	0.43	2.14	0			
	1.7 km	249.2	7/24	18.0	4,040	28.90	6.42	0.80	4.01	1.61	19.66	2.01	0.40	1.61	0			
	1st km total	483.0	--	--	--	46.79	4.55	0.41	3.31	0.83	39.54	2.28	0.41	1.86	0			
	2.1 km	299.0	7/24	18.0	4,080	12.04	7.36	1.33	4.01	2.01	3.01	0	0	0	0			
	2.(10) km	269.2	7/24	18.0	4,160	12.26	8.17	4.09	3.34	1.11	1.49	0	0	0	0			
	2nd km total	568.2	--	--	--	12.14	7.74	2.64	3.70	1.58	2.29	0	0	0	0			
	3.3 km	280.6	8/3	19.5	4,160	8.91	5.35	1.43	4.28	0.36	1.07	0.71	0	0.71	0			
	3.7 km	308.4	8/3	18.0	4,200	5.51	4.54	2.27	1.95	0.32	0.65	0.32	0.32	0	0			
	3rd km total	589.0	--	--	--	7.13	4.92	1.87	3.06	0.34	0.85	0.51	0.17	0.34	0			
	4.1 km	254.6	8/3	17.0	4,240	8.64	5.11	2.36	1.96	0.79	0	3.53	1.18	2.36	0			
	4.9 km	308.3	8/3	16.5	4,320	6.81	3.89	0.32	2.59	0.97	1.30	1.30	0	0	0			
	4th km total	562.9	--	--	--	7.64	4.44	1.24	2.31	0.89	0.71	2.31	1.24	1.07	0			
	5.8 km	161.8	8/3	15.5	4,360	11.12	9.27	5.56	3.71	0	0	0	0	0	0			
	5.(10) km	195.2	8/4	15.0	4,440	12.30	11.78	6.15	4.61	1.02	0	0	0	0	0			
	5th km total	357.0	--	--	--	11.76	10.64	5.88	4.20	0.56	0	0	0	0	0			
	6.1 km	173.5	8/4	15.0	4,440	11.53	10.37	3.46	5.76	1.15	0	0	0	0	0			
	6.8 km	227.8	8/4	15.5	4,600	10.97	10.10	3.95	6.14	0.88	0	0	0	0	0			
	6th km total	401.3	--	--	--	11.21	10.22	3.74	5.98	0.99	0	0	0	0	0			
	7.1 km	218.1	8/4	15.5	4,680	12.38	11.00	7.34	3.67	0	0	0.46	0	0.46	0			
	7.6 km	126.9	8/6	13.0	4,720	8.67	5.52	3.15	2.36	0	0	0	0	0	0			
	7th km total	345.0	--	--	--	11.01	8.99	5.79	3.19	0	0	0.29	0	0.29	0			
	8.4 km	139.5	8/6	14.0	4,840	9.32	7.89	4.30	2.87	0.72	0	0	0	0	0			
	8.6 km	120.9	8/6	14.0	5,000	9.10	8.27	4.96	3.31	0	0	0	0	0	0			
	8th km total	260.4	--	--	--	9.22	8.06	4.61	3.07	0.38	0	0	0	0	0			
	9.3 km	173.3	8/7	14.0	5,200	5.19	0.58	2.89	1.73	0	0	0	0	0	0			
	TOTALS	3,740.1	--	--	+1,160	14.38	6.95	2.78	3.50	0.80	5.70	0.75	0.27	0.48	0			

Table 14. Length frequencies of all fish observed day-snorkeling in Baldy Creek, July 1994.

mm	Cutthroat trout	Steelhead trout	Bull trout	Chinook salmon	Sculpin
<50	0	0	0	0	4
50	16	0	0	152	8
75	88	10	2	61	6
100	69	11	1	0	3
125	41	6	4	0	0
150	21	1	0	0	0
175	16	0	0	0	0
200	3	0	0	0	0
225	4	0	0	0	0
250	3	0	0	0	0
275	2	0	0	0	0
300	2	0	0	0	0
Total	260	28	7	213	21

Comparisons of day versus night snorkeling on density counts of fish were strongly in favor of night snorkeling for highest densities. All night snorkels had higher densities, ranging from 55% increase in density in night snorkeling transects 3.7 km and 8.6 km, to 13% increase in transect 6.1 km (Table 15).

Bear Creek

We snorkeled 11 transects in Bear Creek during the day and repeated 2 transects at night. We snorkeled Bear Creek from August 9 through August 11, except transect 1.1 km, which was snorkeled on July 7, 1994. We snorkeled an area of 1,817.7 m² in Bear Creek.

We saw one bull trout in Bear Creek, which made up 0.5% of all the fish we observed. Density of bull trout was 0.17/100 m² for the first kilometer (Table 16). This bull trout was captured during night snorkeling. The bull trout measured 18.5 cm and was PIT-tagged and polymer marked (Table 9).

Westslope cutthroat trout were the most abundant fish encountered and made up 84% of all the fish observed. Cutthroat trout were found in every transect, with the highest density being found in transect 4.4 km (Table 17) and was 21.45 fish/100 m². The overall density of cutthroat trout in Bear Creek was 8.75 fish/100 m². The most frequently observed size class of cutthroat trout were fish in the 7.5 to 10 cm range (Table 18).

Chinook salmon made up 3.2% of all fish observed in Bear Creek. They were found in the first third of Bear Creek, and in three of the first four transects. The highest density was in transect 1.1 km at 1.43 fish/100 m². In the first two kilometers, chinook salmon had a density of 0.74 fish/100 m². For Bear Creek overall, chinook salmon had a density of 0.39 fish/100 m² (Table 17). The size class of chinook salmon was split with four fish in the 5 to 7.5 cm range and three in the 7.5 to 10 cm range (Table 18).

Steelhead/rainbow trout were the second most abundant fish in Bear Creek at 8.0% of the total fish observed. They were found only in the first kilometer with the highest density in transect 1.1 km at 4.28 fish/100 m². The density for the first kilometer total was 2.57 fish/100 m², and 0.83 fish/100 m² for the entire Bear Creek (Table 17). The most frequent size class of steelhead trout encountered were individuals in the 7.5 to 10 cm range (Table 18).

The two comparisons of day versus night snorkeling counts for estimating fish density on Bear Creek were split in their outcomes. In transect 1.1 km, the night snorkeling density was 12.5% (Table 19) higher than the daytime counts. In transect 4.4 km, the daytime count density is 14.7% higher than the nighttime density.

Table 15. Comparison of day vs. night snorkeling on fish densities (per 100 m²) in Baldy Creek, July-August, 1994.

<10 Transect cm	10-15	River >15 area (m ²)	Snorkel survey	Date	Total fish	-----Cutthroat trout-----				Chinook salmon (age 0)	-----Steelhead trout-----				-----Bull trout-----		
						Total	<10	10-15	>15		Total	<10	10-15	>15	Total		
						density	cm	cm	cm		density	cm	cm	cm	density	cm	cm
1.7		249.2	Day	7/24	28.90	6.42	0.80	4.01	1.61	19.66	2.01	0.40	1.61	0	0	0	0
			Night	7/24	44.54	6.42	0	5.23	1.20	34.11	2.81	0.80	1.61	0.40	0	0	0
3.7		308.4	Day	8/3	5.51	4.54	2.27	1.95	0.32	0.65	0.32	0.32	0	0	0	0	0
			Night	8/3	11.02	7.78	3.24	3.57	1.30	0	0	0	0	0	0	0	0
6.1		173.5	Day	8/4	11.53	10.37	3.46	5.76	1.15	0	0	0	0	0	0.58	0	0.58
			Night	8/26	13.26	10.37	1.15	7.49	1.73	0	0	0	0	0	0.58	0	0.58
8.6		120.9	Day	8/6	9.10	8.27	4.46	3.31	0	0	0	0	0	0	0.83	0.83	0
			Night	8/26	19.95	17.36	7.44	7.44	2.48	0	0	0	0	0	2.48	1.65	0.83

Table 16. Occurrence and density (per 100 m²) of bull trout in Bear Creek, July-August, 1994.

Transect	Creek Creek area (m ²)	Date	Temp (C)	Elev.	Total fish Total density	-----Bull trout-----			
						Total	<10 cm	10-15 cm	>150 cm
1.1 (Night)	280.1	8/10	--	--	7.50	0.36	0	0	0.36
1.7 km	303.4	8/9	14.0	--	5.60	0	0	0	0
1st km totals	583.5	--	--	--	6.51	0.17	0	0	0.17

Table 17. Observed fish densities (per 100 m²) in Bear Creek, July-August, 1994. (Total fish, includes all fish in Table 18.)

Transect	River area (m ²)	Date	Temp (C)	Elev.	Total fish	-----Cutthroat trout-----				Chinook Salmon (age class 0)	-----Steelhead trout-----			
						Total density	<10 cm	10-15 cm	>15 cm		Total density	<10 cm	10-15 cm	>15 cm
1.1 km	280.1	7/7	14.0		7.50	1.07	0	1.07	0	1.43	4.28	2.50	1.79	0
1.7 km	303.4	8/9	14.0		5.60	2.64	1.32	0.66	0.66	0.66	0.99	0.99	0	0
1st km total	583.5	--	--	--	6.51	1.89	0.69	0.86	0.34	1.03	2.57	1.71	0.86	0
2.6 km	174.8	8/9	14.0		10.87	9.73	5.15	4.00	0.57	0	0	0	0	0
2.8 km	190.4	8/9	14.5		9.45	6.83	3.68	3.15	-	0.53	0	0	0	0
2nd km total	365.2	--	--	--	10.13	8.21	4.38	3.56	0.22	0.27	0	0	0	0
3.3 km	134.2	8/10	14.0		7.45	7.45	4.47	2.98	0	0	0	0	0	0
3.5 km	172.8	8/10	14.0		5.79	5.79	4.05	1.74	0	0	0	0	0	0
3rd km total	307.0	--	--	--	6.51	6.51	4.23	2.28	0	0	0	0	0	0
4.2 km	142.6	8/10	14.0		21.03	21.03	18.23	2.81	0	0	0	0	0	0
4.4 km	191.1	8/11	13.5		21.45	21.45	17.27	4.19	0	0	0	0	0	0
4th km total	333.7	--	--	--	21.28	21.28	17.71	3.60	0	0	0	0	0	0
5.5 km	113.7	8/11	13.0		17.60	17.60	14.07	3.52	0	0	0	0	0	0
5.8 (RF)	92.5	8/11	13.0		2.16	2.16	2.16	0	0	0	0	0	0	0
5.8 (LF)	76.11	8/11	14.0		6.57	6.57	6.57	0	0	0	0	0	0	0
5th km total	282.3	--	--	--	9.56	9.56	8.15	1.45	0	0	0	0	0	0
Totals	1,817.7	--	--	--	10.62	8.75	6.33	2.26	0.17	0.39	0.83	0.55	0.28	

* (RF) = right fork
(LF) = left fork

Table 18. Length frequencies of all fish observed day-snorkeling in Bear Creek, July-August, 1994.

mm	Steelhead trout	Cutthroat trout	Chinook salmon	Bull trout	Sculpin
<50	0	18	0	0	0
50	0	35	4	0	2
75	10	62	3	0	6
100	3	28	0	0	2
125	2	12	0	0	0
150	0	1	0	0	0
175	0	1	0	0	0
200	0	0	0	0	0
225	0	1	0	0	0
250	0	0	0	0	0
275	0	1	0	0	0
300	0	0	0	0	0
Total	15	159	7	0	8

Table 19. Comparison of day vs. night snorkeling on fish densities (per 100 m²) in Bear Creek, July-August, 1994.

Transect	River area (m ²)	Snorkel survey	Date	Total fish	-----Cutthroat trout-----				Chinook salmon (age 0)	-----Steelhead trout-----				-----Bull trout-----			
					Total density	<10 cm	10-15 cm	>15 cm		Total density	<10 cm	10-15 cm	>15 cm	Total density	<10 cm	10-15 cm	>15 cm
1.1 km	280.1	Day	7/7	7.50	1.07	0	1.07	0	1.43	4.28	2.50	1.79	0	0	0	0	0
		Night	8/10	8.57	3.21	1.79	1.43	0	1.07	3.21	1.43	1.43	0.36	0	0	0	0
4.4 km	191.1	Day	8/11	21.45	21.45	17.27	3.19	0	0	0	0	0	0	0	0	0	0
		Night	8/10	18.31	18.31	14.65	3.66	0	0	0	0	0	0	0	0	0	0

Sing Lee Creek

We snorkeled five transects in Sing Lee Creek during the daytime, with no night snorkeling in any of the transects. We snorkeled Sing Lee Creek on August 12, 1994. We snorkeled an area of 436.2 m². No bull trout were seen.

Westslope cutthroat trout was the most common fish observed in Sing Lee Creek and made up 49% of all fish documented. Cutthroat trout were found throughout Sing Lee Creek in every transect, having the highest density in transect 2.0 km (LF) at 10.0 fish/100 m². Throughout all transects, cutthroat trout had a density of 6.19 fish/100 m² (Table 20). The most frequent size of cutthroat trout observed were fish in the 5 to 7.5 cm category (Table 21).

Chinook salmon were observed in only one transect of the five snorkeled on Sing Lee Creek. They were observed in transect 1.5 km at a density of 1.85 fish/100 m². When figured in with all transects on Sing Lee Creek, chinook salmon had a density of 0.69 fish/100 m² (Table 20). Chinook salmon made up 5.5% of all fish observed in Sing Lee Creek. All chinook salmon seen in Sing Lee Creek were in the 7.5 to 10 cm category (Table 21).

Steelhead/rainbow trout made up 18% of all fish observed in Sing Lee Creek. They were only documented in the first kilometer transects at a density of 3.33 fish/100 m² (Table 20). Steelhead trout density in the five transects sampled on Sing Lee Creek was 2.29 fish/100 m². The most frequently documented size class of steelhead trout were individuals in the 5 to 7.5 cm range (Table 21).

Sculpin were second only to cutthroat trout in abundance at 18.2% of all fish observed. The most frequent size sculpin observed were 5 to 7.5 cm fish (Table 21).

Upper Newsome Creek

We snorkeled 12 transects in Upper Newsome Creek during the day, including three of these transects for night snorkeling. We snorkeled Upper Newsome Creek from August 17 to August 19, 1994. We started pacing at the confluence of Radcliff Creek and Upper Newsome Creek and all transects above this point. We snorkeled a total area of 2,248.0 m² in Upper Newsome Creek. No bull trout or steelhead/rainbow trout were observed.

Westslope cutthroat trout were found in every transect in Upper Newsome Creek and made up 98.6% of all fish observed. The highest concentration of cutthroat trout was found in transect 1.8 km (Table 22) at a density of 44.25 fish/100 m². Throughout Upper Newsome Creek the density of cutthroat trout was 19.35 fish/100 m² (Table 22). The most frequently observed size class of cutthroat trout were fish less than 5 cm long (Table 23).

Table 20. Observed fish densities (per 100 m²) in Sing Lee Creek, August 1994. (Total fish, includes all fish in Table 21.)

Transect	River area (m ²)	Date	Temp (C)	Elev.	Total fish density	-----Cutthroat trout-----				Chinook salmon (age class 0)	-----Steelhead trout-----			
						Total density	<10 cm	10-15 cm	>15 cm		Total density	<10 cm	10-15 cm	>15 cm
1.4 km	138.2	8/12	15/0	4,000	7.24	2.89	2.17	0.72	0	0	4.34	4.34	0	0
1.5 km	162.6	8/12	15.0	4,000	11.69	4.92	2.46	2.46	0	1.85	2.46	2.46	0	0
1st km totals	300.2	--	--	--	9.66	3.99	2.33	1.66	0	0.99	3.33	3.33	0	0
2.0 (LF)	40.0	8/12	15.0	4,030	17.50	10.00	10.00	0	0	0	0	0	0	0
2.3 (LF)	37.9	8/12	15.0	4,080	29.02	2.64	2.64	0	0	0	0	0	0	0
2.7 km	58.3	8/12	14.0	4,080	25.73	17.15	8.58	8.58	0	0	0	0	0	0
2nd km totals	136.2	--	--	--	24.23	11.01	7.34	3.67	0	0	0	0	0	0
Totals	436.2	--	--	+80.0	14.21	6.19	3.89	2.29	0	0.69	2.29	2.29	0	0

(LF) = left fork

Table 21. Length frequencies of all fish observed day-snorkeling in Sing Lee Creek, August 1994.

mm	Steelhead trout	Cutthroat trout	Chinook salmon	Bull trout	Sculpin
<50	0	0	0	0	5
75	7	12	0	0	7
100	3	5	3	0	1
125	0	5	0	0	2
150	0	5	0	0	0
175	0	0	0	0	0
Totals	10	27	3	0	15

Table 22. Observed fish densities (per 100 m²) in Upper Newsome Creek (above Radcliff Creek confluence), August 1994. (Total fish, includes all fish in Table 23).

Transect	River area (m ²)	Date	Temp (C)	Elev.	Total fish density	-----Cutthroat trout-----				Chinook salmon (age class 0)	-----Steelhead trout-----			
						Total density	<10 cm	10-15 cm	>15 cm		Total density	<1- cm	10-15 cm	>15 cm
1.7 km	321.1	8/17	15.0	4,200	14.95	14.95	13.39	1.25	0.31	0	0	0	0	0
1.8 km	248.6	8/17	15.0	4,200	44.25	43.85	38.21	5.23	0.40	0	0	0	0	0
1st km total	569.7	--	--	--	27.73	27.56	24.22	2.98	0.35	0	0	0	0	0
2.1 km	341.4	8/17	17.0	4,240	23.43	23.43	23.14	0.29	0	0	0	0	0	0
2.2 km	171.0	8/17	17.0	4,240	40.94	40.94	34.50	5.26	1.17	0	0	0	0	0
2nd km total	512.4	--	--	--	29.27	29.27	26.93	1.95	0.39	0	0	0	0	0
3.3 (RF)	162.2	8/18	11.0	4,280	3.70	3.70	2.47	1.23	0	0	0	0	0	0
3.7 (RF)	139.5	8/18	13.0	4,360	7.17	6.45	5.73	0.72	0	0.72	0	0	0	0
3rd km total	301.7	--	--	--	5.30	4.97	3.98	0.99	0	0.33	0	0	0	0
4.4 (RF)	177.6	8/18	16.5	4,400	6.33	15.20	8.46	5.66	1.13	0	0	0	0	0
4.8 (RF)	135.0	8/18	16.5	4,480	14.07	14.07	8.15	5.19	0.74	0	0	0	0	0
4th km total	312.6	--	--	--	15.36	14.72	8.32	5.44	0.96	0	0	0	0	0
3.2 (LF)	110.8	8/18	15.0	4,280	30.68	30.68	29.78	0.90	0	0	0	0	0	0
3.5 (ILF)	107.5	8/18	15.0	4,320	13.02	12.09	10.23	0.93	0	0	0	0	0	0
3rd km total	218.3	--	--	--	21.99	21.53	20.16	1.37	0	0	0	0	0	0
4.1 (LF-RF)	105.6	8/19	12.0	4,400	4.73	4.73	2.84	1.89	0	0	0	0	0	0
4.1 (LF-RF)	227.7	8/19	12.0	4,400	7.03	6.58	3.95	2.64	0	0	0	0	0	0
4th km total	333.3	--	--	--	6.30	6.00	3.60	2.40	0	0	0	0	0	0
Totals	2,248.0	--	--	+200	19.62	19.35	16.46	2.58	0.31	0.04	0	0	0	0

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Table 23. Length frequencies of all fish observed day-snorkeling in Upper Newsome Creek, August 1994.

mm	Steelhead trout	Cutthroat trout	Chinook salmon	Bull trout	Sculpin
<50	0	245	0	0	1
50	0	53	0	0	2
75	0	71	1	0	2
100	0	32	0	0	0
125	0	18	0	0	0
150	0	9	0	0	0
175	0	5	0	0	0
200	0	0	0	0	0
225	0	0	0	0	0
250	0	0	0	0	0
275	0	2	0	0	0
300	0	0	0	0	0
Totals	0	435	1	0	5

Only one chinook salmon was observed in Upper Newsome Creek and this individual was in transect 3.7 km (RF) (Table 22). The density of chinook salmon in this transect was 0.72 fish/100 m². This fish was 7.5 cm long (Table 23).

In the three night snorkels done in Upper Newsome Creek for day versus night comparisons, the night snorkels consistently had higher densities. These ranged from an 80% decrease in density from night to day snorkeling enumerations in transect 3.3 km (RF) (Table 24) to a 25% decrease from day to night snorkeling in transect 3.2 km (LF).

Haysfork Creek

We snorkeled 10 transects in Haysfork Creek during the day and repeated two of these transects for night snorkeling comparisons. We snorkeled Haysfork Creek between August 23 and August 25, 1994. We snorkeled an area of 1,803 m². No bull trout or steelhead/rainbow trout were observed in any transects.

Chinook salmon were the most frequently observed fish in Haysfork Creek at 57.2% of the fish counted. They were found primarily in the first 2 km, and had a density of 16.50 fish/100 m² in these four transects. Throughout Haysfork Creek they had a density of 8.31 fish/100 m². The highest density of chinook salmon was found in transect 1.4 km with a density of 32.31 fish/100 m² (Table 25). The most frequently observed size class were fish in the 7.5 to 10 cm range (Table 26).

Westslope cutthroat trout made up 36.6% of fish observed in Haysfork Creek. They were found in every transect, with the highest density in transect 4.7 km at 10.49 fish/100 m². The density of cutthroat trout throughout Haysfork Creek was 5.32 fish/100 m² (Table 25). The most frequently observed size class of cutthroat trout were individuals in the 7.5 to 10 cm range (Table 26).

The comparison of day versus night snorkeling densities in Haysfork Creek was very lopsided and heavily favored higher densities in the night snorkeling enumerations. We saw 65% more fish in transect 4.7 km at night than during day enumerations. In transect 1.4 km, we saw 50% more fish during night than day snorkeling counts (Table 27).

DISCUSSION

All of the randomly-selected study transects contained fish, although significant trends in species composition throughout the drainage was documented.

Table 24. Comparison of day vs. night snorkeling on fish densities (per 100 m²) in Upper Newsome Creek (above Radcliff Creek confluence), August, 1994.

Transect	Creek area (m ²)	Snorkel survey	Date	Total fish density	-----Cutthroat trout-----				Chinook salmon (age 0)	-----Steelhead trout-----				-----Bull trout-----			
					Total density	<10 cm	10-15 cm	>15 cm		Total density	<10 cm	10-15 cm	>15 cm	Total density	<10 cm	10-15 cm	>15 cm
2.1 km	341.4	Day	8/17	23.43	23.43	23.14	0.29	0	0	0	0	0	0	0	0	0	0
		Night	8/17	37.20	33.09	30.46	2.64	0	0	0	0	0	0	0	0	0	0
3.3 (RF) km	162.2	Day	8/18	3.70	3.70	2.47	1.23	0	0	0	0	0	0	0	0	0	0
		Night	8/18	18.50	14.79	10.48	3.69	1.84	0	0	0	0	0	0	0	0	0
3.2 (LF) km	110.8	Day	8/18	30.68	30.68	29.78	0.90	0	0	0	0	0	0	0	0	0	0
		Night	8/18	40.61	36.10	28.88	5.41	1.80	0	0	0	0	0	0	0	0	0

Table 25. Observed fish densities (per 100 m²) in Haysfork Creek, August 1994. (Total fish, includes all fish in Table 26)

Transect	River area (m ²)	Date	Temp (C)	Elev.	Total fish density	-----Cutthroat trout-----				Chinook salmon (age class 0)	-----Steelhead trout-----			
						Total density	<10 cm	10-15 cm	>15 cm		Total density	<10 cm	10-15 cm	>16 cm
1.4 km	216.6	8/23	13.0	4,120	34.62	1.84	-	1.38	0.46	32.31	0	0	0	0
1.5 km	200.5	8/23	14/0	4,120	36.90	9.47	2.99	5.98	0.49	26.93	0	0	0	0
1st km total	417.1	--	--	--	35.72	5.51	1.44	3.59	0.47	29.00	0	0	0	0
2.4 km	221.5	8/23	14.0	4,160	12.64	4.96	1.80	3.16	0	6.32	0	0	0	0
2.9 km	234.5	8/23	15.0	4,200	7.67	5.11	2.55	1.70	0.85	2.55	0	0	0	0
2nd km total	456.0	--	--	--	10.08	5.04	2.19	2.41	0.43	4.38	0	0	0	0
3.9 km	162.8	8/24	11.0	4,200	3.07	3.07	1.22	1.84	0	0	0	0	0	0
3.(10) km	176.9	8/24	14.0	4,200	5.65	4.59	1.69	2.26	0.56	0	0	0	0	0
3rd km total	339.7	--	--	--	4.41	3.82	1.47	2.06	0.29	0	0	0	0	0
4.1 km	202.3	8/24	14.0	4,200	7.41	9.39	2.48	1.97	0	2.96	0	0	0	0
4.7 km	114.3	8/24	15.0	4,280	13.21	10.49	5.24	5.24	0	0	0	0	0	0
4th km total	316.6	--	--	--	9.47	6.63	3.47	3.16	0	1.89	0	0	0	0
5.5 km	149.3	8/24	12.5	4,360	4.68	2.00	2.00	0	0	0	0	0	0	0
4.2 trib	124.6	8/25	10.0	4,240	12.03	10.43	6.42	4.01	0	0	0	0	0	0
Totals	1,803.3	--	--	+240	14.52	5.32	2.22	2.66	0.27	8.31	0	0	0	0

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Table 26. Length frequencies of all fish observed day-snorkeling in Haysfork Creek, August 1994.

mm	Steelhead trout	Cutthroat trout	Chinook salmon	Bull trout	Sculpin
<50	0	2	0	0	1
50	0	7	56	0	7
75	0	34	93	0	5
100	0	27	1	0	3
125	0	13	0	0	0
150	0	8	0	0	0
175	0	4	0	0	0
200	0	0	0	0	0
225	0	0	0	0	0
250	0	1	0	0	0
225	0	0	0	0	0
250	0	0	0	0	0
Totals	0	96	150	0	16

Table 27. Comparison of day vs. night snorkeling on fish densities (per 100 m²) in Haysfork Creek, August 1994.

Transect	Creek area (m ²)	Snorkel survey	Date	Total fish density	-----Cutthroat trout-----				Chinook salmon (age 0)	-----Steelhead trout-----				-----Bull trout-----			
					Total density	<10 cm	10-15 cm	>15 cm		Total density	<10 cm	10-15 cm	>15 cm	Total density	<10 cm	10-15 cm	>15 cm
1.4 km	216.6	Day	8/23	34.62	1.84	0	1.38	0.46	32.31	0	0	0	0	0	0	0	0
		Night	8/25	70.17	12.00	2.77	6.92	3.23	50.78	0	0	0	0	0	0	0	0
4.7 km	114.3	Day	8/24	13.21	10.49	5.24	5.24	0	0	0	0	0	0	0	0	0	0
		Night	8/24	37.62	22.74	6.12	13.99	2.62	2.62	0	0	0	0	0	0	0	0

Westslope cutthroat trout were found throughout and had the highest densities, except in many lower reach transects in tributaries concentrated with juvenile chinook salmon.

Juvenile chinook salmon and steelhead/rainbow trout followed a trend in most tributaries by concentrating in the first few kilometers of the creeks, above the confluence with the mainstem of Newsome Creek. They were generally not found in upper reaches. This situation follows the pattern observed by Platts et al. (1983), where "juvenile chinook salmon and steelhead/rainbow trout were found throughout the river, except in the upper five miles (8 km), where only bull trout were found." This seems to be true with both Pilot and Baldy creeks, the only two creeks we snorkeled with substantial numbers of bull trout.

Counts of age class 0 chinook salmon encountered while snorkeling are artificially high, the product of hatchery supplementation. One-hundred and fifty surplus adult chinook salmon from Crooked River were released to spawn in Newsome Creek in 1993. Aerial spawning ground surveys for the previous ten counts (1982 through 1992) average 5.9 redds per year in Newsome Creek from the mouth to Radcliff Creek.

Bull trout were found in three of the seven tributaries of the Newsome Creek drainage. Except for the individual bull trout observed and captured in Bear Creek, they were all found in the upper half of both Pilot and Baldy creeks. These two creeks have not been significantly dredged in the upper 2/3 of their lengths, and they seem to have a good buffer zone between the steep sides of their canyons and the nearest clear-cuts. Both Pilot and Baldy creeks are higher gradient streams with a good mix of complexity in the substrate of the streams, with lots of down-felled woody debris. Water temperature did not seem to dictate a threshold in bull trout abundance, but the bull trout we encountered were in the upper reaches of Pilot and Baldy creeks where temperatures were cooler, but not drastically different from other transects or creeks within the drainage. It would be difficult to suggest if these bull trout in the upper reaches are resident or fluvial or a mixture of both.

We only captured and PIT-tagged/polymer marked three fish, and we did not see any fish with polymer marks while snorkeling. However, the scale samples from these fish might provide an age estimate to help classify these fish as fluvial or resident, depending on size and age. We would tend to believe that the bull trout we observed in the upper reaches, with the most frequently seen size class of 8 inches, are resident fish, while the larger fish, such as the 18-inch individual observed in Pilot Creek, and the nine larger bull trout (Schriever 1994) trapped and tagged at the Newsome Creek weir (upstream), are fluvial fish that are migrating upstream to spawn or move out of the warmer water of the South Fork Clearwater River.

Only further research will dictate validity of any assumptions, as none of these fish were seen or trapped again. Regardless, the abundance of bull trout in the Newsome Creek drainage, even mainstem Newsome Creek (Schriever 1993) is not very high. Maybe it never was, but measures to protect areas of their highest abundance, Pilot and Baldy, should be administered.

The day versus night snorkeling comparisons were in favor to higher densities and numbers of fish enumerated while night snorkeling. However, many night snorkels were done at considerable distances of time apart from day snorkels, meaning fish could migrate into and out of the areas during the time elapsed, perhaps invalidating a strong comparison between such transects. Another possibility in the comparison is that there might be a higher percentage of recounts in night snorkeling as fish are attracted to the light. Bull trout had about the same densities from day to night snorkeling events. Sculpin were noticeably easier to count at night, increasing the total fish density in favor of night snorkeling. In either case, it can be assured that densities of all fish determined by snorkeling are lower than the true densities of the population. There is simply too much chance for error in missing fish, thanks to the shallow depth, and escape cover in these tributaries.

No correlations were made between any of the substrate habitat conditions on any of these tributaries, but these can be used for comparisons over time, comparing continued disturbances, or evaluation mitigating efforts.

LITERATURE CITED

- Platts, W.S., and F.E. Partridge. 1983. Inventory of salmon, steelhead trout, and bull trout: South Fork Salmon River, Idaho. U.S.D.A. Forest Service Paper INT-324. Intermountain Forest and Range Exp. Station, Ogden, Utah.
- Platts, W.S., W.F. Megahan, and G.W. Minshall. 1983. Methods for evaluating stream, riparian, and biotic conditions. U.S.D.A. Forest Service Paper INT-GTR-138. Intermountain Forest and Range Exp. Station, Ogden, Utah.
- Schriever, E. 1994 (in press). Newsome Creek fish trap and creel census. South Fork Clearwater River progress report. Idaho Department of Fish and Game, Boise.
- Schriever, E., and P. Russell. 1993 (in press). Bull trout investigations. Snorkel surveys - South Fork Clearwater River progress report. Idaho Department of Fish and Game, Boise.
- Thurrow, R.F. 1994. Underwater methods of study of salmonids in the intermountain west. U.S.D.A. Forest Service Gen. Tech. Report INT-GTR-307. Ogden, Utah.

Appendix C. Fork and total length, PIT tag numbers, and date and location of white sturgeon tagged in the Snake and Salmon rivers below Hells Canyon Dam during the 1991-1994 field seasons.

Tag number	River	River km	Date	Total length (cm)	Fork Length (cm)
7F7F403D7F	SNAKE	365	6/24/91	71	—
7F7F402C31	SNAKE	362	6/24/91	191	—
7F7F40234F	SNAKE	365	8/28/91	33	—
7F7F403B1B	SNAKE	282	8/16/91	160	—
7F7F403458	SNAKE	362	6/24/91	77	—
7F7F40396D	SNAKE	382	8/29/91	71	—
7F7F403141	SNAKE	290	8/23/91	208	—
7F7F40387B	SNAKE	382	8/29/91	97	—
7F7F403130	SALMON	21	8/14/91	196	—
7F7F403618	SNAKE	286	9/7/91	71	—
7F7F403E2D	SALMON	27	8/14/91	151	—
7F7F401D2C	SNAKE	284	9/7/91	40	—
7F7F403C0E	SNAKE	305	8/23/91	182	—
7F7F403673	SALMON	30	8/14/91	126	—
7F7F402C69	SNAKE	264	6/11/91	180	—
7F7F402B0E	SNAKE	365	6/25/91	170	—
7F7F40285A	SNAKE	260	7/24/91	155	—
7F7F403C35	SNAKE	365	6/25/91	142	—
7F7F365102	SNAKE	382	6/25/91	277	—
7F7F402F69	SNAKE	297	8/23/91	249	—
7F7F403B19	SNAKE	367	7/14/91	211	—
7F7F3F5547	SNAKE	362	7/14/91	153	—
7F7F402B1B	SNAKE	362	6/29/91	243	—
7F7F402C7A	SNAKE	378	6/24/91	127	—
7F7F402272	SNAKE	278	9/13/91	153	—
7F7F427941	SNAKE	381	3/5/92	213	198
7F7F441E72	SNAKE	362	3/27/92	115	103
7F7F42600A	SNAKE	365	3/28/92	140	126
7F7F427702	SNAKE	365	3/28/92	71	64
7F7F42797C	SNAKE	302	3/29/92	175	159
7F7F42711B	SNAKE	302	3/29/92	185	167
7F7F427B05	SNAKE	260	4/6/92	97	86
7F7F42767D	SNAKE	290	4/9/92	129	119
7F7F3D494F	SNAKE	291	4/11/92	104	93
7F7F427528	SNAKE	302	4/11/92	133	121
7F7F45774D	SNAKE	302	4/11/92	244	218
7F7F427125	SNAKE	264	4/12/92	137	120
7F7F425C58	SNAKE	302	4/12/92	231	213
7F7F426555	SNAKE	302	5/7/92	155	0
7F7F443219	SNAKE	302	6/14/92	213	193
7F7F427941	SNAKE	381	3/5/92	213	198
7F7F441E72	SNAKE	362	3/27/92	115	103
7F7F42600A	SNAKE	365	3/28/92	140	126
7F7F427702	SNAKE	365	3/28/92	71	64
7F7F42797C	SNAKE	302	3/29/92	175	159
7F7F42711B	SNAKE	302	3/29/92	185	167
7F7F427B05	SNAKE	260	4/6/92	97	86
7F7F42767D	SNAKE	290	4/9/92	129	119
7F7F3D494F	SNAKE	291	4/11/92	104	93
7F7F427528	SNAKE	302	4/11/92	133	121
7F7F45774D	SNAKE	302	4/11/92	244	218
7F7F427125	SNAKE	264	4/12/92	137	120
7F7F425C58	SNAKE	302	4/20/92	231	213
7F7F426555	SNAKE	302	5/7/92	155	—
7F7F443219	SNAKE	302	6/14/92	213	193
7F7F427963	SNAKE	291	6/17/92	259	243

Appendix C. Continued.

Tag number	River	River km	Date	Total length (cm)	Fork Length (cm)
7F7F443351	SNAKE	290	6/17/92	113	101
7F7F426044	SNAKE	296	6/17/92	243	218
7F7F427B26	SNAKE	336	6/23/92	123	112
7F7F427512	SNAKE	331	6/23/92	117	105
7F7F3F6459	SNAKE	319	6/24/92	138	126
7F7F441F6E	SNAKE	381	6/28/92	191	168
7F7F426071	SNAKE	290	6/29/92	187	166
7F7F442A0D	SNAKE	381	6/29/92	251	221
7F7D0D6739	SNAKE	339	8/8/92	151	135
7F7D0D657E	SNAKE	310	8/9/92	162	145
7F7D0D776C	SNAKE	339	8/10/92	119	110
7F7D0D6DOF	SNAKE	349	8/10/92	141	129
7F7D0D6A15	SNAKE	296	8/18/92	110	96
7F7D0D6D01	SNAKE	290	8/18/92	213	193
7F7D0D5D10	SNAKE	325	8/31/92	107	91
7F7D0A2D0F	SNAKE	283	9/3/92	173	154
7F7D0D695A	SNAKE	283	9/3/92	133	122
7F7D0C0014	SNAKE	296	9/3/92	93	86
7F7D0D742C	SNAKE	267	9/18/92	208	189
7F7D0D6052	SNAKE	266	4/26/93	137	119
7F7D0D5E04	SNAKE	301	4/29/93	72	65
7F7D0D6113	SNAKE	301	4/29/93	72	64
7F7D0D6744	SNAKE	266	4/29/93	99	86
7F7D0D650A	SNAKE	266	4/29/93	89	81
7F7D0D7722	SNAKE	266	4/29/93	86	76
7F7D0B7824	SNAKE	266	4/29/93	76	70
7F7D0D5F69	SNAKE	337	5/10/93	259	231
7F7D0D6528	SNAKE	382	5/11/93	183	163
7F7D0D7B06	SNAKE	382	5/11/93	224	213
7F7D0D623F	SNAKE	360	5/26/93	95	83
7F7D075B7D	SNAKE	313	5/31/93	126	113
7F7D0D662D	SNAKE	381	6/7/93	249	—
7F7D0D6735	SNAKE	382	6/7/93	122	107
7F7D0B7440	SNAKE	313	6/8/93	70	61
7F7D0C192F	SNAKE	387	6/21/93	183	170
7F7D0D7768	SNAKE	366	6/23/93	71	64
7F7D0D5C48	SNAKE	310	6/25/93	84	75
7F7D0D650L	SNAKE	312	6/25/93	99	89
7F7D0D6417	SNAKE	328	6/26/93	70	61
7F7D0D7314	SNAKE	292	7/3/93	76	66
7F7D0D6D29	SNAKE	301	7/3/93	79	70
7F7D0D731B	SNAKE	301	7/3/93	76	69
7F7D0B7272	SNAKE	286	7/3/93	97	90
7F7D0D785A	SNAKE	286	7/3/93	78	71
7F7D0D775E	SNAKE	286	7/3/93	81	72
7F7D0D6202	SNAKE	296	7/5/93	76	69
7F7D0D6C3F	SNAKE	292	7/5/93	76	67
7F7D052A7B	SNAKE	292	7/5/93	64	57
7F7D0D6A50	SNAKE	292	7/5/93	84	74
7F7D0B677F	SNAKE	296	7/5/93	91	81
7F7D0D6813	SNAKE	296	7/5/93	125	114
7F7D0D704E	SNAKE	296	7/5/93	74	65
7F7D0D7B00	SNAKE	294	7/9/93	208	188
7F7D0D7530	SNAKE	286	7/9/93	88	81
7F7D0D7427	SNAKE	290	7/9/93	91	81
7F7D0D6012	SNAKE	266	7/16/93	84	75
7F7D0D650E	SNAKE	266	7/16/93	79	—
7F7D0D7B3E	SNAKE	296	7/17/93	86	76
7F7D0D6L25	SNAKE	302	7/17/93	84	74

Appendix C. Continued.

Tag number	River	River km	Date	Total length (cm)	Fork Length (cm)
7F7D0D6056	SNAKE	285	6/7/94	84	72
7F7D0A266A	SNAKE	295	6/7/94	76	66
7F7D0D676E	SNAKE	359	6/1/94	94	89
7F7D0D6426	SNAKE	359	6/1/94	88	77
7F7D0D6276	SNAKE	359	6/1/94	69	60
7F7D0B7854	SNAKE	338	6/2/94	151	137
7F7D0C0367	SNAKE	336	6/8/94	246	224
7F7D0D6923	SNAKE	305	6/8/94	226	198
7F7D0D624A	SNAKE	305	6/24/94	145	132
7F7D0D6D1F	SNAKE	370	3/11/94	188	170
7F7D0A2722	SNAKE	362	8/27/94	69	61
7F7D07A778	SNAKE	295	5/21/94	91	81
7F7D0D6B21	SNAKE	295	8/21/94	91	81
7F7D0B7754	SNAKE	332	5/21/94	118	107
7F7D0D7048	SNAKE	285	6/7/94	79	69
7F7D0B6745	SNAKE	359	6/1/94	93	84
7F7D0D785F	SNAKE	338	5/13/94	64	56
7F7D0D7170	SNAKE	334	5/14/94	118	107
7F7D0D651F	SNAKE	334	5/13/94	140	122
7F7D0D7D5D	SNAKE	334	5/14/94	77	69
7F7D0D622E	SNAKE	334	5/14/94	110	102
7F7D0D6B6D	SNAKE	334	5/14/94	72	66
757D0D780F	SNAKE	336	5/14/94	124	112
7F7D0B6703	SNAKE	312	6/11/94	122	109
7F7D0D6C60	SNAKE	343	5/13/94	75	69
7F7D0C0D05	SNAKE	332	5/14/94	198	183
7F7D0D6A5C	SNAKE	327	6/8/94	173	155
7F7D0D6912	SNAKE	338	5/13/94	112	104
7F7D05335B	SNAKE	332	5/14/94	127	114
7F7D0D6C16	SNAKE	332	5/14/94	127	114
7F7D0B790D	SNAKE	334	4/30/94	138	127
7F7D0D7C28	SNAKE	334	4/30/94	131	119
7F7D0D6747	SNAKE	334	4/30/94	88	79
757D0D7B04	SNAKE	295	4/17/94	124	107
7F7D076907	SNAKE	285	4/17/94	86	75
7F7D0D6042	SNAKE	285	4/17/94	88	76
7F7D0D5F5B	SNAKE	285	4/17/94	84	74
7F7D0D6A7B	SNAKE	285	4/17/94	85	76
7F7D0D7660	SNAKE	285	4/17/94	175	155
7F7D0B737E	SNAKE	288	4/17/94	84	74
7F7D025ESB	SNAKE	288	4/17/94	103	91
7F7D0D6521	SNAKE	334	4/30/94	137	122
7F7D0D7661	SNAKE	334	4/28/94	79	69
7F7D0D7247	SNAKE	334	4/28/94	97	84
7F7D0C1756	SNAKE	337	4/17/94	71	65
7F7D0D7E36	SNAKE	332	4/23/94	159	142
7F7D0D7070	SNAKE	343	4/22/94	70	61
7F7D0D773A	SNAKE	343	4/24/94	77	67
7F7D0B6640	SNAKE	343	4/24/94	150	141
7F7D0D6176	SNAKE	338	4/24/94	103	91
7F7D0B792E	SNAKE	338	4/24/94	69	61
7F7D0D6B2A	SNAKE	338	4/24/94	71	62
7F7D0D6C52	SNAKE	338	4/24/94	89	79
7F7D0F7055	SNAKE	338	4/24/94	145	126
7F7D0D6F11	SNAKE	343	4/28/94	145	127
7F7D0D6047	SNAKE	338	4/24/94	80	74
7F7D032044	SNAKE	336	4/24/94	267	239

Appendix C. Continued.

Tag number	River	River km	Date	Total length (cm)	Fork Length (cm)
7F7D0D7E32	SNAKE	296	7/17/93	81	72
7F7D0D7716	SNAKE	299	7/18/93	211	193
7F7D0D6706	SNAKE	296	7/18/93	79	71
7F7D0D794C	SNAKE	296	7/19/93	252	236
7F7D0D735E	SNAKE	296	8/11/93	89	81
7F7D0D7D0D	SNAKE	302	8/11/93	79	69
7F7D0D6C66	SNAKE	302	8/11/93	89	79
7F7D0B622D	SNAKE	302	8/17/93	74	66
7F7D0B687F	SNAKE	292	8/22/93	74	66
7F7D0D5C04	SNAKE	296	9/14/93	70	64
7F7D0B7541	SNAKE	302	10/10/93	64	56
7F7D0F713E	SNAKE	299	9/17/94	184	—
7F7D100F20	SNAKE	322	9/24/94	101	91
7F7D0A4778	SNAKE	265	10/4/94	188	—
7F7D0F590E	SNAKE	299	9/25/94	190	170
7F7D0B4734	SALMON	51	8/14/94	206	178
7F7D100C17	SNAKE	365	9/17/94	115	98
7F7D347C06	SNAKE	365	9/7/94	210	193
7F7D044919	SNAKE	322	9/24/94	190	168
7F7D07076D	SNAKE	288	7/19/94	63	57
7F7D042B28	SALMON	56	8/20/94	180	160
7F7D3D6E57	SNAKE	299	7/17/94	95	81
7F7D3F4A4E	SNAKE	336	10/9/94	213	191
7F7B076069	SNAKE	295	8/25/94	250	230
7F7D100932	SNAKE	266	10/4/94	81	64
7F7D350A22	SNAKE	266	10/4/94	76	67
7F7B0D4043	SNAKE	332	10/20/94	107	90
7F7D0B7441	SNAKE	336	6/19/94	170	155
7F7D0D6E2A	SNAKE	266	6/16/94	239	216
7F7D0D6147	SNAKE	323	6/26/94	155	135
7F7D0D6246	SNAKE	323	6/29/94	94	83
7F7D0C0250	SNAKE	323	6/26/94	168	147
7F7D0D6F35	SNAKE	358	6/15/94	112	102
7F7D0D7002	SNAKE	380	6/15/94	157	142
7F7D0B6704	SNAKE	358	6/15/94	84	74
747D0B6544	SNAKE	358	6/15/94	118	102
7F7D0D5C2B	SNAKE	322	6/18/94	109	97
7F7D0E3357	SNAKE	322	6/9/94	183	171
7F7D0E3B03	SNAKE	358	6/19/94	67	83
7F7D0F2352	SNAKE	322	6/18/94	91	72
7F7D0F6432	SNAKE	322	6/29/94	91	72
7F7D0B426F	SNAKE	327	6/29/94	194	173
7F7D113B7F	SNAKE	330	6/29/94	138	124
7F7D11595B	SNAKE	336	6/29/94	126	113
7F7B0D260B	SNAKE	336	6/28/94	117	103
7F7D0E5B66	SNAKE	336	6/28/94	107	94
7F7D0D5F2F	SNAKE	338	6/28/94	102	91
7F7D0D6D73	SNAKE	338	6/28/94	146	132
7F7D0D7C59	SNAKE	341	6/28/94	127	114
7F7D043D77	SNAKE	343	6/28/94	178	163
7F7D045517	SNAKE	336	6/28/94	165	149
7F7D0D776B	SNAKE	352	6/28/94	123	110
7F7D0B7860	SNAKE	343	6/2/94	160	145
7F7D0D5D43	SNAKE	352	6/2/94	102	??
7F7D0D607C	SNAKE	359	6/1/94	198	183
7F7D052513	SNAKE	285	6/7/94	79	69
7F7D0D6418	SNAKE	285	6/7/94	75	66
7F7D0D640E	SNAKE	285	6/7/94	80	71
7F7D0D683R	SNAKE	285	6/7/94	98	81

1994 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-19

Project II: Technical Guidance

Subproject II-B: Clearwater Region

Contract Period: July 1, 1994 to June 30, 1995

ABSTRACT

Clearwater Region fish management personnel offered technical guidance to 18 state, federal, and tribal agencies, and 53 private entities on timber sales, mining, stream channel alteration permits, hydropower development, farm pond permits, and other proposed activities.

We investigated three fish kills, one each on Tommy Taha Creek, Middle Fork Clearwater River, and Winchester Lake. All of these kills were attributed to warmwater conditions during the late summer.

We sponsored or co-sponsored 12 youth fishing clinics throughout the Region on Free Fishing Day. We also sponsored youth educational clinics for fly fishing and steelhead fishing.

We produced and printed informational brochures on fishing the Selway and Lochsa rivers.

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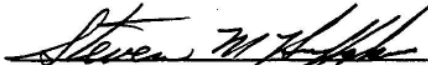
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